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AND

WORLD METEOROLOGICAL ORGANIZATION

REPORT OF THE TYPHOON COMMITTEE

ON ITS EIGHTH SESSION

**Bangkok, Thailand
11 - 17 November 1975**



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REPORT OF THE TYPHOON COMMITTEE (EIGHTH SESSION)

(Item 6 of the provisional agenda)

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I. ORGANIZATION OF THE SESSION

1. The eighth session of the Typhoon Committee was held at Bangkok from 11 to 17 November 1975.

Attendance

2. The session was attended by representatives of Hong Kong, Japan, the Philippines, and Thailand, and by observers from France, Germany (Federal Republic of), Malaysia, Union of Soviet Socialist Republics, United States of America, United Nations Development Programme (UNDP), International Civil Aviation Organization (ICAO), Office of the United Nations Disaster Relief Co-ordinator (UNDRO), League of Red Cross Societies (LRCS) and Committee for Co-ordination of Investigations of the Lower Mekong Basin.

3. The Committee welcomed the attendance of the representative of Malaysia as an observer at the session and noted the interest Malaysia had expressed in the activities of the Committee.

Opening addresses

4. Opening addresses were given on behalf of the Executive Secretary of ESCAP, Mr. J.B.P. Maramis, by Mr. H. Rudy Gontha, Special Assistant, and on behalf of the Secretary-General of WMO, Dr. D.A. Davies, by the Chief of the Hydrology and Water Resources Department, Professor J. Nemec.

5. Mr. Maramis, after welcoming the representatives, spoke of the need for constant and careful reappraisal of the programme the Committee was carrying out. In 1974, the cost of tropical cyclone and flood damage in ESCAP countries had reached record levels, amounting to at least \$US3,500 million. Some 4,000 lives had been lost and more than 33 million people had been directly affected by those disasters. Although the Committee had accomplished a great deal in the seven years of its existence, the upward trend in damage costs called for a redoubling of its efforts. He urged that very careful consideration be given to the resources available and assistance required so that the Committee's important activities could continue uninterruptedly.

6. Dr. Davies recalled that the Committee had made considerable progress since 1968, credit for which must go to the participating countries. He paid tribute to donor countries and to UNDP, and recorded his appreciation to ESCAP for its collaboration.

7. In reviewing the work ahead and the role of the Typhoon Committee secretariat (TCS) in that work, Dr. Davies stressed that the ultimate aim must be for the countries themselves to staff and finance TCS but that international support would still be required until that objective was attained. In connexion with the Tropical Cyclone Project; which covered many areas of the world where such storms occurred, the WMO Seventh Congress had noted with appreciation the work of the Committee. It was WMO's belief that an exchange of experience between all those areas could contribute to coping with the immense tasks facing all the nations involved.

Election of officers

8. Dr. Roman L. Kintanar (Philippines) was elected Chairman of the Committee for 1975/76; Dr. Charoen Charoen-rajabark (Thailand) was elected Vice-Chairman; Dr. P.C. Chin (Hong Kong) was elected Chairman of the Drafting Committee.

Agenda

9. The Committee adopted the following agenda:

1. Opening of the session
2. Election of the Chairman and Vice-Chairman
3. Adoption of the agenda
4. The Committee's activities during 1975
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Community preparedness and disaster prevention
 - (d) Training and research
5. UNDP technical support to the regional typhoon programme
 - (a) Under the 1974-1976 project
 - (i) Equipment component
 - (ii) United Nations experts and counterpart staff
 - (iii) Fellowships
 - (iv) Bilateral assistance
 - (b) UNDP support beyond 1976
6. Staffing of the Typhoon Committee secretariat beyond 1976
7. Programme for 1976
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Community preparedness and disaster prevention
 - (d) Training and research
8. Co-ordination with the WMO Tropical Cyclone Project and regional programmes
9. Liaison with the WMO/ESCAP Panel on Tropical Cyclones

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10. Consideration of the agenda for the next session of the Committee
11. Date and place of the ninth session
12. Adoption of the report

II. THE COMMITTEE'S ACTIVITIES DURING 1975 (WRD/TC.8/4)

10. The Committee reviewed the progress made in implementing its programme during 1975. Important advances had been made in a number of ways and specific mention was made of the new observing and telecommunication facilities forming part of the World Weather Watch plan, of the community preparedness and disaster prevention activities such as the guidelines and the seminar to be held in 1976, and of increased work in the research component.

A. IMPROVEMENT OF METEOROLOGICAL FACILITIES

11. The review of meteorological facilities was based, as in the past, upon the requirements of the World Weather Watch for its observing and telecommunication systems with special reference to the requirements for an efficient typhoon warning system and the priorities established by the Committee at its seventh session.

Global Observing System (GOS)

12. The Committee recalled its earlier recommendation that the Philippines might concentrate on the regular operation of three RS/RW stations (Cebu, Clark and Laoag), and noted with satisfaction that special efforts made by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) had resulted in an increased number of observations at Cebu. Observations from Clark continued to be received regularly. However, there were interruptions in Laoag observations, which recorded 60 per cent observations only, mainly on account of shortage of hydrogen gas. PAGASA had recently imported hydrogen generators and the position was expected to improve in the near future. The ground equipment for the RS/RW station at Zamboanga had been delivered in June 1975 and observations were expected to commence at that station before the end of 1975.

13. The Committee was informed that the 10-cm radars at Baguio, Cebu, Daet and Virac and the 5.6 cm radar at Manila continued to be operational. The 10-cm radar at Guian was brought into operation in 1975. The 10-cm radar at Basco (included in the priority list) was in the process of installation. Unfortunately, the antenna and the transmitter-receiver had been damaged by a typhoon on 12 October. Steps were being taken to replace the damaged parts.

/Two additional

Two additional 10-cm radars were to be installed in the vicinity of Manila and at Aparri (northern tip Luzon) in 1976.

14. The representative of Thailand informed the Committee that a 10-cm radar, procured through national resources, was under installation at Bangkok. It was expected to be operational by early 1976. The Committee was further informed that a new radar station would be set up at Chumphon on the east coast of south Thailand by transferring the existing 10-cm radar from Khon Kaen in northeast Thailand. The two 10-cm radar stations, together with the existing 5.6 cm radar at Songkhla, would provide a good network for detecting tropical cyclones.

15. Regarding the establishment of a 10-cm radar at Vientiane, the representative of the USSR confirmed his Government's readiness to provide the radar together with necessary accessories under VAP assistance to Laos. The equipment was expected to be supplied by early 1976, subject to completion of required formalities.

16. The Committee noted with satisfaction that the radar test equipment supplied to the Republic of Korea under the UNDP project had been utilized for the calibration and adjustment of the 10-cm radar at Mt. Kwanaksan, Seoul, and the auxiliary display unit at the Central Meteorological Office, and that the telecommunication and electronics expert of TCS had assisted in those adjustments.

17. As reported at the seventh session, APT equipment had been offered by the United States under VAP for installation at Phnom-Penh. The Committee learnt that the equipment was delivered in January 1975 and that its installation was completed in March 1975.

18. The Committee noted with satisfaction that five USSR research vessels had been operating in the Western Pacific since July 1975 to study in particular the movements of typhoons. Surface and upper air observations were received by Japan from the ships and were retransmitted over the GTS from Tokyo RTH. The Committee recorded its appreciation to the Soviet authorities for continuing and expanding that valuable assistance. It expressed the hope that the USSR would consider the continuation of the programme in future years and noted that it would involve appropriate advance planning for the use of the necessary port and other facilities.

19. The Committee also learnt with satisfaction that Japan had operated the ocean weather station "TANGO" (29°N, 135°E) from May to October 1975 and that the JMA weather ship "KEIFUMARU" had operated at 20°N, 130°E during July-August 1975 and near Torishima island in September 1975. The surface and upper air reports made by those ships were disseminated over the GTS.

20. The Committee was informed that ships from the Federal Republic of Germany had continued to make special observations during the typhoon season and had transmitted them to coastal radio stations. Two research vessels had operated in sea areas between the Republic of Korea and Japan, and German aircraft were making more than 1,800 observations per annum in areas of interest to the Committee. It expressed its appreciation of the contribution to its work.

21. In addition to the Japanese ocean buoy installed at 28° 20' N, 126° 05' E in September 1974, a new buoy had been installed at 25° 40' N, 135° 55' E in November 1974 and both had continued to be operational in 1975. Another new ocean buoy had been installed at 37° N, 147° E in July 1975 and had since been functioning satisfactorily. In that connexion, the representative of the Philippines informed the Committee that the possibility of procuring a set of similar buoys for operation around the Philippines was being explored.

Global Telecommunication System (GTS)

22. The Committee noted with satisfaction that the programme to improve the national data collection in the Philippines had been actively pursued during 1975 through surveys and recommendations made by TCS. Twenty new sets of 100W SSB transceivers and 20 pieces of 3650 kc crystals had been procured by early 1975. New antennas were expected to be installed at three stations before the end of the year while the provision of additional antenna was planned for 1976.

23. A revised VAP request amounting to \$US178,000 for the improvement of telecommunication facilities in the Philippines, mainly aimed at the collection of radar pictures at Manila from other radar stations in the Philippines, had been approved by WMO in 1974. The Committee was pleased to learn that France had offered to provide two SSB transceivers for the partial implementation of that project.

24. The Committee was pleased to note that the Manila-Tokyo point-to-point circuit, which had been implemented in October 1974, had been functioning quite satisfactorily and that recent statistics had shown that reliability of data exchange on the circuit had been 98.5 per cent.

25. The representative of Hong Kong reported that the Hong Kong-Peking regional telecommunication link was expected to be implemented in December 1975. Arrangements were being made by the Royal Observatory to enhance the telecommunications computer capability for carrying out automatic switching and editing of messages. The representative of Japan expressed the hope that the Tokyo-Peking communication link would be operational in the very near future.

26. The Committee noted with interest that a broadcast station using two 10-kW medium wave transmitters had been established at Manila under the direct control of PAGASA. The broadcast station had come into regular operation as from 1 July 1975. In addition to broadcast of hourly weather information, the broadcast station would ensure prompt dissemination of typhoon warnings. The Committee was also informed that the broadcast station would also be utilized for educational programmes relating to disaster prevention activities.

27. In connexion with the assistance offered by Japan to Laos for the provision of SSB equipment and spare parts worth \$US15,000 and in accordance with the Committee's recommendation at the seventh session, the telecommunication and electronics expert of TCS had conducted a survey in Laos during November-December 1974 and a detailed report on the survey was sent to Japan in January 1975. The Committee was pleased to learn that Japan had placed orders for the equipment and that it was expected to be supplied to Laos by early 1976. Consideration would be given to sending a technician to Laos to assist in its installation.

28. Recalling that the Bangkok-Vientiane point-to-point circuit had been established in 1974 with VAP assistance to Laos from the USSR and that the circuit had been initially operated by using antenna provided by France, the Committee was informed that the required antenna and other accessories had been supplied to Laos by the USSR in January 1975.

29. The Committee learnt with satisfaction that facsimile transmitters and receivers worth \$US100,000, supplied to Thailand under bilateral aid by the Federal Republic of Germany, had been installed in December 1974 at the Central and Airport Meteorological Offices at Bangkok and at the regional centres at Chiangmai, Ubon and Songkhla. The Federal Republic of Germany had also offered fellowships for the training of two technicians.

30. In regard to a revised VAP request for the remaining equipment required for the strengthening of the Bangkok RTH, the Committee was informed that WMO was consulting potential donor countries. In that connexion, the Committee was pleased to learn from the representative of the USSR that his Government was ready to supply receivers and two transmitters in 1976.

31. After reviewing the current status of the observing the telecommunication facilities required for the typhoon warning system, which formed part of the World Weather Watch plan, the Committee examined the priority list established by the seventh session and revised the list as given below:

Observing facilities

(i) Upper-air stations

Already planned

48991 Phnom-Penh (Cambodia) - VAP request

98223 Laoag (Philippines))

98645 Cebu (Philippines)) 12 GMT radiosonde/radiowind

(ii) Weather radar

Already planned

Cheju (Republic of Korea) (or other selected site) - National project

Vientiane (Laos) - VAP request (offered by USSR)

Basco (Philippines) - National project (being implemented)

Bangkok (Thailand) - National project (being implemented)

(iii) Ocean weather station

Already planned

Ship at 16°N, 135°E (offered by the USSR)

Telecommunication facilities

(i) National collection facilities

Already planned

Laos - National/UNDP/Bilateral project

Philippines - National/UNDP/VAP project

(ii) Regional telecommunication links

Bangkok-Phnom-Penh - National project 1976

Bangkok-Saigon - National project 1976

Tokyo-Peking - National project 1975 (being implemented)

Hong Kong-Peking - National project 1975 (being implemented)

(iii) Other telecommunication facilities

Partial implementation planned

Thailand - strengthening of RTH, Bangkok - National/UNDP/VAP project.

The Committee urged member countries to endeavour to establish those facilities as soon as possible.

32. In addition to the questions dealt with above, the Committee recorded its view on a number of other matters under that component of its programme. They are dealt with below:

Typhoon forecasting techniques

33. The Committee noted with satisfaction that the review paper on typhoon forecasting techniques prepared by the Chief Technical Adviser of TCS had been revised by incorporating additional information collected during discussions of the paper in various countries. The revised paper had been distributed to the member countries. Copies of the paper had also been distributed by WMO to other countries concerned with tropical cyclone forecasting.

34. The seventh session of the Committee had been informed that the Japan Meteorological Agency (JMA) had published a manual on typhoon forecasting (in Japanese) in 1974. In response to the Committee's request for its translation into English, the representative of Japan informed the Committee that the translation work would soon be undertaken after incorporating some amendments to the current text.

Output products of RMCs

35. The Committee was informed that, in accordance with the recommendation of the seventh session, TCS had undertaken a review of the output products of the regional meteorological centres with a view to ascertaining whether they were meeting the requirements of typhoon warnings. Suggestions so far received were being analysed by TCS in consultation with the RMC concerned.

Exchange of radar fixes

36. The Committee noted with satisfaction that radar fix messages had been exchanged between the member countries as in the previous years. The representative of Hong Kong reported that, during January-October 1975, 78 reports had been disseminated by the Royal Observatory and 542 reports received from other countries. The Committee considered that the network of radar stations had substantially improved in the typhoon area and that exchange of radar fixes could provide very useful information for typhoon warning purposes. It urged the member countries to continue to take all possible steps to ensure regular and prompt exchanges of radar fix messages.

/Meteorological

Meteorological reconnaissance flights

37. The Committee noted with appreciation that reconnaissance flights by United States aircraft in the typhoon area had continued to provide valuable information for typhoon warning services. It expressed the hope that the United States would continue its programme of typhoon reconnaissance flights in the years ahead. The representative of the United States confirmed that no change was contemplated in the current typhoon reconnaissance programme.

Meteorological satellites

38. The Committee was pleased to note that Japan had continued its preparations for launching the GMS at 140°E in June 1977. The representative of Japan drew the attention of the Committee to the detailed information on the GMS programme furnished at the seventh session and referred to a new document entitled "GMS programme of Japan", which had been circulated to participants.

39. The Committee noted with appreciation that an NOAA-4 satellite had been successfully launched by the United States in November 1974 and that it had continued to provide direct read-out services (APT, HRPT and VTPR). It was recalled that JMA had developed the Satellite Data Processing System (SDPS) for reducing the distortion of NOAA satellite pictures. The pictures from NOAA-4 processed through SDPS were broadcast by JMA and were received by other countries by radio facsimile. In that connexion, the representative of the United States informed the Committee that devices on board its future spacecraft were being considered as a means of avoiding distortion of the satellite imagery.

B. IMPROVEMENT OF HYDROLOGICAL FACILITIES

40. The Committee noted with interest the progress made in the evolution of comprehensive plans for the establishment, improvement and extension of pilot flood forecasting and warning systems in selected river basins of member countries. Important developments during 1975 had included the following:

Japan

41. The Committee was informed that flood forecasts were being issued by the Ministry of Construction and the Japan Meteorological Agency for 17 major rivers; the Ministry of Construction and prefectural governments were issuing flood warnings for many other rivers. An on-line data collection and dissemination system for comprehensive river administration was being developed by the Ministry of Construction; installation of pilot systems had been started in the Kiso and Shonai river basins.

/Republic

Republic of Korea

42. The Ministry of Construction had prepared detailed instructions for implementation of the Han river flood forecasting system, which had been effective as from April 1975. A method for the optimum operation of the five dams in the basin during floods had also been devised so that an advance release of water stored in the reservoir could be ordered by the National Disaster Control Centre when necessary. Improvements to the forecasting system were being made through a grant from the Government of Japan for additional equipment and spare parts.

Laos

43. A preliminary survey of the Se Bang Hieng River basin had been conducted in January/February 1975 jointly by three experts provided by the Government of Japan and the TCS hydrologist, together with Laotian government officials. An interim recommendation on the installation of a basic hydrological network had been made by the survey team during the mission. The report of the survey was being printed.

Philippines

44. Continued improvements to stations in the Pampanga River basin had been made by PAGASA and the Bureau of Public Works with the assistance of a Japanese telecommunication expert, whose assignment to the Flood Forecasting Centre had been extended for six months to cover the year 1975. The necessary action to restore the monitoring station which had been damaged by fire in December 1974 had been taken by BPW and repairs were expected to be completed before the flood season in 1976. The representative of the Philippines expressed the hope that the Japanese Government would further extend the assignment of the Japanese telecommunication expert in the Flood Forecasting Centre to assist in the extension of the flood forecasting system in the Agno and Marikina basins and in the repair of the damaged monitor station at BPW. The representative of Japan said that he would convey the request to his Government.

45. The Government of Japan had prepared a manual for the operation of the Pampanga Flood Forecasting System on the basis of experience gained by the experts assigned to the project. The manual was expected to be available when a team of Japanese experts carried out a review mission in late 1975. TCS had prepared a technical note entitled "Review of the implementation of the Flood Forecasting System in the Pampanga River Basin, Philippines."

46. Some preparations for extending the flood forecasting to the Agno and Marikina river basins had been made by PAGASA and BPW. A preliminary study of flood forecasting in the Agno river basin had been effected through a survey conducted jointly by PAGASA, BPW, Japanese experts assigned to the Flood Forecasting Centre and TCS. With the technical guidance of a Japanese expert, the Flood Forecasting Centre had carried out an investigation of the telecommunications aspects of the forecasting network proposed by TCS.

Thailand

47. During 1975, the Government of Thailand had continued its trial flood forecasting programme in the Maeklong River with similar arrangements to those in 1974. The Meteorological Department had established a new hydro-meteorological station at Umphang in the upper part of the Kwaie Yai basin. The case study of past floods of the Kwaie Noi had been continued by the Royal Irrigation Department for 1974 flood events. An attempt was being made by RID to computerize the calculations involved in the case study.

48. A preliminary survey for the establishment of a flood forecasting system in the Maeklong river basin had been conducted jointly by a team of Japanese experts and the TCS hydrologist in co-operation with representatives of the Thai agencies concerned. A report of that survey was being printed in Japan and was expected to be forwarded to the Government of Thailand soon.

C. COMMUNITY PREPAREDNESS AND DISASTER PREVENTION

Joint LRCS/WMO/ESCAP Missions

49. The Committee was informed that it had not been possible to extend the Mission's visits to the remaining member countries (Cambodia and Laos) in 1975. In view of the absence of representatives of those countries from the session, the Committee decided that it was unable to plan for the visits to be made in 1976. It felt, however, that the three organizations contributing to the Joint Mission should continue to keep the situation under review so that proposals could be made if and when circumstances permitted.

50. The Committee learnt that a one-day meeting had been arranged in Seoul in June 1975 as part of the action to follow up the Joint Mission to the Republic of Korea in 1973. Fruitful discussions had been held with representatives of the Ministry of Construction, the Central Meteorological Office and the Korean National Red Cross Society. That visit was the third of its kind made by the Joint Mission, the Philippines and Thailand having had follow-up visits in October 1974 and November 1973 respectively. It was felt that those visits provided a very good opportunity to review progress in implementing proposals agreed upon during earlier Joint Missions and to exchange new ideas for the improvement of the typhoon warning system. The Committee therefore wished to encourage strongly the continuation of such informal meetings and requested LRCS, WMO and ESCAP to make the necessary arrangements with member countries whenever a suitable opportunity occurred.

51. The action taken with the Government of Thailand following the floods in the south of that country in early 1975 was noted by the Committee. The representative of Thailand informed the Committee that the activities of the National Committee for Disaster Preparedness (NCDP) now formed part of those of a larger national committee dealing with a broader range of natural disasters. The Committee stressed the need for Thailand to actively pursue the recommendations made by the Joint Mission within the context of the new Committee so that a better and more integrated system would be available to cope with future disaster.

52. The Committee wished to record its thanks to the Government of Japan for the measures it had taken to implement the recommendations made by the Joint Mission during its visit in 1974. Two valuable publications, the Disaster Countermeasures Basic Law and the Disaster Prevention Plan for Sakae Macchi had been translated into English and printed in sufficient copies for members of the Typhoon Committee and other interested countries. In addition, Japan had announced its decision to finance the Regional Seminar on Community Preparedness and Disaster Prevention, and progress in the arrangements being made for the seminar were reported to the Committee (see below).

53. Hong Kong reported that most of the major recommendations made by the Joint Mission in 1973 had been implemented. There had been a major improvement in the availability of disaster relief facilities and there was much closer liaison between the different government departments involved.

54. The Philippines reported that a new radio broadcasting station had been set up under the joint control of PAGASA and the Office of Civil Defense (OCD). This station was used not only for the dissemination of important information at times of emergency but also for the education of the public in disaster prevention. The value of developing a programme of radio broadcasts was stressed and the Philippines stated that it would welcome suggestions from other countries and the organizations concerned on the formulation of a long-term programme of that type.

55. The Committee recorded its view that particular attention should be given to public education and information programmes. There was a need for a full exchange of information between countries on such programmes and it was desirable that efforts be made within countries to involve the responsible authorities at the local level. The Committee was informed that the points made would also be taken fully into account by the editorial board at its forthcoming meeting when it considered the Guidelines chapter on this subject.

56. The desire of UNDR0 to co-operate fully with the Typhoon Committee in the pursuit of its objectives and to assist member countries was noted with appreciation. The representative of UNDR0 informed the Committee of the activities it was currently undertaking, both in disaster preparedness and prevention and in the co-ordination of international relief. He mentioned in particular a series of studies being prepared by UNDR0, with the co-operation of WMO and other organizations, on the current state of knowledge concerning disaster prevention and mitigation, which included some aspects of such subjects as vulcanology, seismology, meteorology, hydrology, land-use, health, building and civil engineering, public information and the economic and sociological aspects of disasters. The world-wide survey of disaster damage for the period 1960 to 1974 which UNDR0 had undertaken to obtain data on the direct and indirect losses from natural disasters, would also help towards the formulation of the international strategy for disaster prevention. The assistance which UNDR0 was obtaining in the survey from ESCAP and other bodies was gratefully acknowledged.

Guidelines on community preparedness and disaster prevention

57. The Committee was informed of the steps that had been taken since the seventh session towards the compilation of a manual providing guidance on the organization of effective disaster prevention systems. The work was being carried out jointly by LRCS, WMO, ESCAP and TCS, each of which was represented on the editorial board set up to assume responsibility for the project.

58. The board had held a first meeting in February 1975, at which a detailed synopsis of the contents had been drawn up and responsibility assigned for the preparation of the different chapters. Informal discussions on the progress made had been held at Manila in June and the board was to meet again immediately following the eighth session of the Committee. A large part of the material was in hand and would be reviewed by the board at its November meeting. Comments had also been received from UNDRO. It was planned that the board would hold a further meeting as early as possible in 1976 to consider the remainder of the material. It was hoped that the Guidelines could be published in 1976.

59. The Committee commended the organizations concerned for the initiative they had taken in following up the proposal which had originally been made by the Joint Mission. It felt that the publication would be of great interest to many developing countries affected by tropical cyclones in providing them with valuable advice for the setting up or improvement of their defensive systems. It therefore endorsed the action taken by LRCS, WMO and ESCAP in preparing the Guidelines and requested them to ensure that publication would be completed as soon as possible.

Regional seminar on community preparedness and disaster prevention

60. The offer of the Government of Japan to finance and act as host to the Regional Seminar on Community Preparedness and Disaster Prevention was warmly welcomed by the Committee. It learnt with appreciation that a sum of \$US50,000 had been set aside from the funds provided by Japan for ESCAP projects for the seminar, which would take place at Tokyo from 14 to 29 June 1976. Detailed planning of the seminar programme had

/already

already been taken up with the Japanese authorities by ESCAP in close co-operation with WMO and LRCS. Most of the necessary decisions on the arrangements for the seminar had been made at a meeting in June 1975 at Tokyo between Japanese government officials and representatives of the three organizations.

61. Invitations would be sent early in 1976 to the member countries of the Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones, to other selected ESCAP member countries and to countries in the tropical cyclone areas of the southwest Indian ocean. The programme would consist of lecture and discussion sessions covering the whole range of community preparedness/disaster prevention activities, the presentation of country papers by participants, a study tour and a final evaluation session. An information paper giving the procedure to be followed in applying for participation, travel arrangements, seminar programme, etc. would be distributed with the formal invitations.

62. In expressing its thanks to the Government of Japan, the Committee requested ESCAP, in co-operation with LRCS and WMO, to spare no effort to ensure the full success of the seminar. It called upon its member countries to participate actively in the seminar by sending at least one person from each country.

Consultant services

63. The question of consultant services in community preparedness and disaster prevention was taken up under agenda item 6 - Staffing of the Typhoon Committee Secretariat after 1976.

D. TRAINING AND RESEARCH

64. In pursuance of an offer made at the seventh session, the Government of Japan had organized a group training course in river engineering for three months commencing 28 August 1975 and another course in meteorology (typhoon forecasting) for four months commencing 25 September 1975. The Committee recorded its appreciation to the Government of Japan for organizing the training courses. It was noted with satisfaction that the chief technical adviser of TCS had given two lectures on typhoon forecasting techniques for the latter course.

/65.

65. The representative of Japan informed the Committee that, in 1976, they would consider organizing similar group training courses in river engineering and in meteorology. The latter course was likely to be on calibration and maintenance of weather radar.

66. The representative of the Philippines thanked the Government of Japan for providing facilities for two senior officials of PAGASA and the Bureau of Public Works to visit Japan for familiarization with the flood forecasting organization in Japan. He informed the Committee that his Government had notified WMO of the availability of meteorological training leading to an M.Sc. degree at the University of the Philippines as its contribution to VAP.

67. Recalling the offers of assistance made at the seventh session by France and the United States in the field of training, and earlier offers made by Australia and the Federal Republic of Germany, it was reported that several trainees had taken advantage of those offers. The Committee was informed that, during 1975, Thailand had received five fellowships from Australia and two from the Federal Republic of Germany, Laos had received three fellowships from France and the Philippines had submitted a proposal for a fellowship in the United States.

68. The representatives of the United States, France and the USSR renewed their earlier offers of assistance for the training of personnel in meteorology and hydrology under bilateral assistance programmes or through VAP. The representative of the United States stated that, for the present, its offer related to long-term fellowships under VAP for B.Sc. degree courses.

69. The Committee noted with interest the decision of the Seventh WMO Congress (April-May 1975) that VAP assistance would in future be applicable to the granting of short-term fellowships for training in WMO activities and in related fields such as hydrology, in addition to the long-term fellowships.

70. The Committee was informed that a WMO/UNDP Workshop on the Uses of Meteorological Radar was held at Kuala Lumpur (Malaysia) from 23 June to 4 July 1975. Mr. V.D. Rockney (United States) had acted as technical director and Mr. S. Marshall (Canada), Mr. H.K. Brann (Australia) and Dr. N. Kodaira (Japan) as consultants for the workshop. It noted with satisfaction that the chief technical adviser of TCS had

/delivered

delivered the opening lecture and participated in the discussions during the first week. Among the member countries of the Typhoon Committee, Hong Kong, Laos, the Philippines and Thailand had sent one participant each to the workshop. Based on his experience in the typhoon area and in the light of the discussions at the workshop, the chief technical adviser of TCS emphasized the urgency and importance of practical training in the calibration and maintenance of weather radar.

71. As requested by the Committee at its seventh session, WMO had submitted to UNDP a proposal for a seminar in 1975 for countries in Asia and the Pacific on hydrological forecasting methods including the use of conceptual models. Another proposal had been made for a seminar on the use of meteorological satellite data for countries in Asia in 1976 or 1977 in accordance with the request made by the seventh session, which was also supported by the WMO/ESCAP Panel on Tropical Cyclones.

72. The Committee noted with satisfaction that the telecommunication and electronics expert of TCS had given on-the-job training in calibration and maintenance of weather radar at Seoul (Republic of Korea) and at Cebu (Philippines). He had also conducted a two-week training course on performance test and preventive maintenance of meteorological radar at Manila/Baguio for technicians from all radar stations in the Philippines. It was further reported that a similar training course would be conducted in Thailand immediately after the session. The Committee welcomed the information that a detailed note on that subject had been prepared by the telecommunication and electronics expert and was being distributed to member countries and to the trainees.

73. The Committee was informed of the research studies initiated under the WMO Tropical Cyclone Project. A status report had been prepared by the WMO secretariat and circulated to member countries, it contained a table summarizing the proposed mode of implementation of the various subprojects and their present status. The Committee noted with satisfaction that some members of the Typhoon Committee and TCS were associated with certain of the subprojects.

74. The Committee noted that, in accordance with the proposal made at the seventh session, the Royal Observatory, Hong Kong, had completed preparations for producing objective forecasts of tropical cyclone tracks by selected techniques and for their dissemination for operational use. A note describing the criteria for the issue of such forecasts and the code and formats to be used had been circulated to the member countries. The concurrence of Japan and Thailand for the dissemination of fuel forecasts through their respective RTIs had also

/been

been obtained. The Committee was pleased to learn that Hong Kong had begun dissemination of the forecasts in September 1975.

75. The Committee was pleased to learn that the UNDP/WMO project on meteorological research and training in the Republic of Korea, which had become operational in early 1974, had continued its programme of training and research. A new building for the Institute of Meteorology had been inaugurated in March 1975.

76. The Committee was also informed of the progress made under the research project entitled "Development of design criteria and methodology for low rise-low cost buildings to better resist extreme winds". This multinational project was being carried out with the participation of the United States, Jamaica, Bangladesh and the Philippines, with its focal point in the Philippines. Progress had been reviewed at a regional meeting held at Manila in May 1975.

77. The Committee recalled that a WMO technical conference on typhoon modification had been held at Manila from 15 to 18 October 1974 in conjunction with the seventh session of the Committee and that representatives of five member countries (Hong Kong, Japan, Philippines, Republic of Korea and Thailand) had participated. The Committee noted with interest the main conclusions of the conference.

78. The representative of the Philippines informed the Committee of the latest position of the typhoon moderation programme of the Government of the Philippines. The building for the air operations unit had been completed and the central headquarters building was under construction. An experiment designed to evaluate the operational techniques of rainfall modification and related studies had been conducted in April-June 1975 over a target area of 200 km² in the Central Philippines. A similar experiment was being planned for early 1976, aimed at the field training of personnel associated with the proposed typhoon moderation programme. The representative of the Philippines reiterated that countries concerned would be consulted before the actual typhoon moderation experiment was undertaken.

79. Referring to the proposed transfer of project STORMFURY to the Pacific, the representative of the United States stated that since 1971, at sessions of the Typhoon Committee and also at ESCAP plenary sessions, the United States had announced its intention to transfer the project to an area of the Pacific where seedable typhoons were more prevalent. The United States Government considered project STORMFURY to be responsive to UN resolution 2914 (XXVII) of 9 November 1972, which called upon the WMO and Member States to discover ways and means to mitigate the harmful effects of tropical storms and to remove or minimize their destructive potential. The representative of the United States further stated

that the project would be transferred only after suitable consultations with all the countries affected. However, since consultations so far had not been satisfactorily concluded, the United States had no plan to move the project to the western Pacific.

80. The Committee noted with appreciation the information given by the representative of France on the scientific report prepared for the WMO Commission on Hydrology by a French specialist, Mr. Trendel, on a technique for the estimation of precipitation resulting from tropical cyclones. The representative of WMO informed the Committee that the report would be circulated to all Committee members in the near future.

81. In accordance with the discussions at the seventh session regarding joint collaboration in typhoon research activities, action had been initiated for studies in storm surges and in objective techniques of typhoon forecasting by the respective co-ordinators (Dr. Miyazaki and Dr. P.C. Chin) in consultation with TCS.

82. Dr. Miyazaki, who was the leader of a team on storm surge prediction under the WMO Tropical Cyclone Project, had visited Hong Kong and the Philippines and discussed problems and the studies in progress with research correspondents and other specialists. The Committee was informed that the Philippines had prepared a report on storm surges in the Philippines for the period 1907-1931. Hong Kong had updated basic statistics of surge data and developed regression equations relating storm surge heights to various storm parameters. A programme had been initiated to carry out numerical modelling of storm surges on open coasts and in enclosed bays. The Committee noted with satisfaction that, as co-ordinator, Dr. Miyazaki had recently circulated a detailed note on storm surges tide gauge observations, etc. together with general guidance for studies that might be undertaken by the participating countries. It considered that the information provided in that note would be very useful to member countries. The Committee noted with interest in that connexion that the team of experts conducting the sub-project on storm surge prediction of the WMO Tropical Cyclone Project would meet in December 1975 and that the manual on storm surge prediction would be published early the following year.

83. The Committee was informed that Dr. P.C. Chin had sent a questionnaire to the research correspondents in other member countries and collected information on the objective and subjective techniques in use for operational typhoon forecasting. Tentative plans for joint studies were under consideration with the research correspondents and the TCS. The Committee recognized that it would be useful at that stage if Dr. P.C. Chin could visit some of the member countries

for discussions. It accordingly requested WMO, ESCAP and TCS to explore the possibility of procuring necessary funds for such travel.

84. The Committee expressed satisfaction with the action initiated by the co-ordinators and reiterated its view that joint collaboration could expedite research on selected problems, assist in the exchange of information and also contribute to the research activities planned under the WMO Tropical Cyclone Project. The Committee accordingly recommended that efforts in that direction should be vigorously pursued.

85. The Committee noted with satisfaction that the Typhoon Committee's activities under training and research had progressively increased in recent years. It therefore agreed with a suggestion that training and research might thereafter be dealt with as separate components and discussed accordingly at future sessions of the Committee.

III. UNDP TECHNICAL SUPPORT TO THE REGIONAL TYPHOON PROGRAMME (WRD/TC.8/6)

86. The Typhoon Committee was pleased to note that the UNDP project "Technical support to the regional typhoon programme", which was approved for a period of three years (1974-1976), was progressing satisfactorily. The project provided for continuation of UNDP assistance to the typhoon programme up to the end of 1976 at a total cost of \$ US 720,900, which included the services of three international experts in the Typhoon Committee secretariat, five fellowships, and equipment of a value of \$ US 350,000.

87. The estimated government contribution to the project amounting to the equivalent of \$ US 435,760 included local costs for the implementation of the programmes, provision of facilities and supporting personnel for the TCS, and for counterpart professional staff at the TCS.

Progress of the UNDP project

88. The progress made is summarized below under the main components of the project:

(a) Equipment component

89. Telecommunication equipment and ancillary equipment for weather radar worth \$ US 263,000 had been ordered by WMO, of which more than half had already been delivered to Laos, the Philippines and the Republic of Korea. Telecommunication equipment worth about \$ US 53,000 had been allocated to Thailand. The equipment would be used for strengthening the Bangkok RTH. The procurement of the balance of the equipment including spare parts was under consideration.

90. The Committee noted with satisfaction that the radar test equipment and spare parts received by the Republic of Korea and the Philippines had already been used for calibration and maintenance purposes with the assistance of the telecommunication and electronics expert of TCS. The project activities under the equipment component were expected to enter a particularly active period in 1976 when the telecommunication equipment for the Philippines, Laos and Thailand would be installed.

(b) United Nations experts and counterpart staff

91. The Committee was informed that the assignments of three international experts serving in TCS had been extended to cover the project period. The supporting staff for TCS (secretaries and drivers) continued to be provided by the Government of the Philippines. Counterpart staff needed for the operation of the pilot flood forecasting systems in the Philippines, Korea and Thailand had also been provided.

92. As regards provision of counterpart professional staff to TCS, the Committee was pleased to learn that the Philippines had assigned a meteorologist to work in TCS from November 1975. The representative of Japan assured the Committee that consideration would be given to assigning a hydrologist to TCS before the end of 1976. The Committee expressed its sincere appreciation to the Governments of the Philippines and Japan for their generous response.

(c) Fellowships

93. The Committee was pleased to learn that out of the five fellowships of one year each earmarked for five member countries (Cambodia, Laos, the Philippines, Republic of Korea and Thailand), fellowships for three countries had already started as follows:

1. Philippines : one fellowship for one year in the United States
2. Republic of Korea : one fellowship for one year in Japan
3. Laos : three fellowships for four months each in Thailand.

94. Nominations for the fellowship for Thailand were still being awaited. The Committee considered that the fellowship for Cambodia could be frozen in view of the current situation and that it could be diverted to another country where it might be more urgently needed in 1976.

/(d)

(d) Bilateral assistance

95. The Committee noted with satisfaction that further bilateral assistance for the project activities had been received during 1974-1975, the most significant of which was the loan of \$US1.5 million from the Government of Japan for the purchase of flood forecasting equipment in the Republic of Korea. Other bilateral or VAP assistance included telecommunication equipment provided by the USSR to Laos, facsimile equipment by the Federal Republic of Germany to Thailand, training facilities by Japan, Australia, France and the United States, and the operation of ocean weather ships in the West Pacific by the USSR.

96. It was recalled that, when approving the project with an equipment component of \$US350,000, UNDP had stipulated that at least a like amount should be obtained through bilateral sources. Negotiations had accordingly been initiated to obtain assistance from the Government of Japan for implementation of pilot flood forecasting systems in Laos and Thailand. As a result, the Government of Japan had already sent a preliminary survey team to Laos and Thailand at the beginning of 1975.

UNDP support beyond 1976

97. The Committee noted with appreciation the amount and variety of the assistance being given by UNDP in the project covering the period 1974-1976. In discussing the assistance that would be required in the years after 1976, the Committee was aware that the subject also included the following agenda item on the staffing of TCS beyond 1976.

98. The Committee agreed that, in drawing up its requirements, a clear distinction should be made between the assistance that would be needed from international sources and the contributions which the member countries would be able to make. The Committee was convinced that, for at least five years after 1976, some international staff would be required and it would also be essential to have international funds available for the purchase of emergency equipment and spare parts indispensable for the continued operation of important observing facilities.

99. The representative of UNDP expressed interest in the report contained in document WRD/TC.8/6 on UNDP support to the regional typhoon programme and said that the headquarters of UNDP would be very pleased with the progress that had been made and also with the generous support provided by member countries,

/notably Japan

notably Japan and the Philippines. The UNDP representative went on to say that the current programme of UNDP assistance, which amounted to \$US720,900, was due to terminate at the end of 1976. It was noted that the Committee considered international experts would be required after 1976, that financial assistance would be needed for the purchase of essential equipment and that it was important for seminars to be arranged. Such requests would be considered by UNDP, which, however, would also wish to know what help could be obtained from other sources, e.g. from member countries themselves, from donor countries, through bilateral assistance programmes, etc.

100. It was pointed out that the assignment of counterpart staff showed that member countries were prepared to start sharing the costs of the regional typhoon programme. The Committee agreed, however, that UNDP support would be required, perhaps at a decreasing rate, for some years to come.

101. The representative of the Philippines said that it would be very clear that his country was a strong supporter of the Committee but considered that UNDP assistance would continue to be essential if the scale of activity was to be maintained. That view was endorsed by the representative of Japan, who reminded the Committee that his country was also a strong supporter of the Typhoon Committee.

102. The representative of Hong Kong agreed on the need for long-term support from UNDP and also considered that the existing strength of TCS should be maintained. For financial reasons it would not be possible for Hong Kong to contribute for the time being.

103. The representative of Thailand expressed appreciation of the assistance that his country had received from Japan. The Committee was aware of Thailand's need for fellowships and it was hoped they would be made available in the near future. He added that Thailand agreed that UNDP support was essential in the years ahead and stressed the importance of a full-time electronics expert on the staff of TCS.

104. The representative of the USSR described the fellowships and training programmes offered by his country to trainees from developing countries. In recent years, some 30 Asian countries had taken advantage of those facilities. The USSR would be willing to provide assistance to countries which wished to have their nationals trained and would probably use the WMO (VAP) system for the arrangements. Training courses and seminars in tropical meteorology and typhoon forecasting would be arranged and vacancies made available to developing countries.

/105.

105. The representative of France said that his country was convinced that all possible help should be given to countries which were affected by typhoons. He emphasized that there was a severe shortage of electronic experts and considered that UNDP aid would be essential for one to be provided for TCS.

106. The further decisions of the Committee on that matter are reported under agenda item 6.

IV. STAFFING OF THE TYPHOON COMMITTEE SECRETARIAT BEYOND 1976
(WRD/TC.8/7)

107. The Committee, having considered under the preceding agenda item, the whole subject of UNDP support to the regional typhoon programme including, in particular, the question of UNDP support beyond 1976, proceeded to a detailed examination of the staff of the Typhoon Committee secretariat after 31 December 1976 when the current programme of UNDP support would come to an end. The Committee recognized that TCS would not be able to continue to function in a satisfactory and effective manner after 1976 without substantial support from UNDP. The Committee noted with satisfaction that the Philippines and Japan would respectively provide a meteorologist and a hydrologist to TCS as counterpart staff starting in 1975 and 1976. In that way the need for UNDP support to TCS would be reduced but, even allowing for other possible sources of assistance, the existence of TCS would remain heavily dependent upon a new programme of UNDP support for the five-year period, 1977-1981. The member countries would of course continue their efforts to provide increasing support to TCS in staff and finance as indicated below.

108. The Committee agreed that, because of the time factor and for other reasons, it was of the utmost importance that a comprehensive statement should be drawn up during its current session setting out TCS staff requirements beyond 1976. The Committee would also need to assess the extent to which the member countries would be able to assume responsibility

/for the staffing

for the staffing of TCS, taking into account the recruitment of personnel and the funding of salaries and allowances, travel and administrative costs. It was estimated that about \$US30,000 would be needed for the travel of counterpart staff over the period of five years. It would also be necessary to consider provision of a fund, estimated at \$US100,000, for the purchase of selected items of technical equipment to supplement the programmes of the member countries in the regional typhoon programme. Fellowships and seminars would also be required in support of training programmes.

109. In regard to counterpart staff, the representative of the Philippines said that his Government would assign a meteorologist to TCS in November 1975 and would keep this post filled as long as necessary. However, if at any time in the future another country wished to contribute a meteorologist to TCS, the Government of the Philippines would be prepared to agree to the change. *Part.*

110. The representative of Japan said that his Government would consider providing a hydrologist to TCS towards the end of 1976 for a period of one year and that extensions might be considered. *Hrd.*

111. With regard to the administrative support of TCS, the representative of the Philippines said that, so long as TCS remained in Manila, his Government would continue to provide that support which currently included two secretaries, two drivers, and other supporting services. *Adm.*

112. In the discussion the Committee kept in mind the statements made under the preceding agenda item by the representative of UNDP on the general subject of support for the regional typhoon programme and by the representatives of France, the United States and the USSR on the possibilities of providing fellowships and other training assistance.

113. The representative of UNDR0 said that his organization was impressed with the achievements of the Typhoon Committee and would be prepared to enter into discussions with ESCAP and WMO concerning any assistance that UNDR0 might provide, particularly in relation to disaster preparedness and prevention.

114. The Committee agreed that, although substantial UNDP support for TCS would be required up to at least 1981, such support could not continue

/indefinitely.

indefinitely. The Committee noted that the appointment to TCS of a meteorologist by the Philippines and of a hydrologist by Japan not only reduced the amount of support required from UNDP but also provided assurances that the member countries of the Typhoon Committee would strive to become self-sufficient and self-supporting. The Committee agreed that that objective and its progress would be reviewed at each future session, at which member countries would be invited to report on progress being made in efforts to provide support to TCS in the way of staff, finance or other suitable means.

115. The Committee accepted therefore a firm obligation to increase their aggregate support of TCS over a period of time so that the assistance applied for from UNDP would be reduced in successive stages. Members agreed to make a special report on the matter to their Governments and it was also suggested that it would be of interest to ESCAP at its next annual session. However, the Committee felt that the extreme importance of its work would be fully appreciated by UNDP and by other possible donor sources. The Committee considered that the importance of its work was such that the staffing and associated requirements of TCS must be assessed objectively and realistically and that it would be potentially dangerous for requirements to be underestimated.

116. On the basis of the above considerations, the Committee agreed that from January 1977 its requirements for TCS would be as shown in the statement appearing under paragraph 118.

117. The Committee expressed the hope that member countries, other countries and supporting bodies would examine the statement of requirements and advise ESCAP and WMO as soon as possible regarding the contributions they would expect to make in helping to meet the stated requirements. The Committee also requested WMO, in consultation with ESCAP and TCS, to prepare an appropriate submission to UNDP in the light of the information already available and that to be received.

118. Recalling the decision it had made at its seventh session that an internationally recruited senior technical adviser would be required for some years to come, the Committee wished to reiterate that view and also

/to state

to state that the existing post of the telecommunications/electronics expert should also continue to be filled by international recruitment. Accordingly the Committee considered it most important that two full-time experts, the senior technical adviser and the telecommunications/electronics expert, should be financed by UNDP.

Requirements of the Typhoon Committee for its programme during the period 1977-1981

1. Experts (full-time)

- (a) Senior technical adviser
- (b) Telecommunications/electronics expert
- (c) Meteorologist
- (d) Hydrologist/flood forecasting expert

2. Consultants

Four man/months per annum for community preparedness/disaster prevention, satellite meteorology, etc.

3. Travel funds

4. Emergency equipment and supplies

Expendable and non-expendable equipment, spare parts, etc.

5. Local expenses for TCS

Office accommodation, supporting staff, supplies, postage, etc.

6. Training

Fellowships and seminars.

119. The following sources for meeting those requirements were currently known:

- Item 1(c) - would be provided by the Government of the Philippines for as long as might be required;
- Item 1(d) - would be provided by the Government of Japan in late 1976 with an expectation of renewal on a yearly basis;
- Item 5 - would be provided by the Government of the Philippines for as long as TCS remained in Manila;

/Item 6

- Item 6 - total requirements for fellowships would be met from bilateral offers or from other sources such as WMO VAP; seminars were expected to be funded under regional programmes.

120. The Committee further wished to express its conviction that the effective functioning of TCS would depend upon the current level of staffing being maintained throughout the 1977-1981 period.

V. PROGRAMME FOR 1976
(WRD/TC.8/5)

121. In considering its programme for 1976, the Committee took into account the latest developments in its activities and the schedule of work as envisaged under the UNDP project for the period 1974-1976. Recognizing that a number of national activities of particular interest to the Committee would be carried out by member countries, the Committee directed that special attention be given, with the assistance of TCS, to the following items of work during 1976:

Meteorological component

(a) Procurement, installation and operation of equipment provided by UNDP under the project and also other equipment obtained through national resources or with bilateral/VAP assistance. That included radar picture transmission equipment to be received by the Philippines and telecommunication equipment to be received by Laos and Thailand under the UNDP project;

(b) Provision or improvement of meteorological and telecommunication facilities included in the priority list established by the Committee. That included provision of 10-cm radar at Bangkok through national resources, provision of 10-cm radar for Vientiane (Laos), and strengthening of the Bangkok RTH through VAP assistance;

(c) Review of existing telecommunication facilities and data exchanges needed for typhoon warning services with a view to initiating remedial measures where necessary;

/(d)

(d) Exploring the possibility of establishing simple automatic marine stations in the typhoon area.

Hydrological component

(a) Further progress in the establishment of pilot flood forecasting systems in Laos and Thailand. Such activities would be based on the survey reports prepared by the team of Japanese experts with TCS participation;

(b) Further improvement in the operation of the flood forecasting system in the Pampanga River Basin (Philippines) based on experience gained since 1973 and on the recommendations of the Japanese review mission in 1975;

(c) Development of flood forecasting in the Agno River basin based on a preliminary study made in 1975;

(d) Organizing visits of hydrologists to other areas with advanced flood forecasting systems and procurement of financial assistance for that purpose from whatever sources that might be available.

Community preparedness and disaster prevention

(a) Undertaking of disaster risk evaluation in typhoon-prone areas on the basis of guidance materials prepared by WMO;

(b) Follow-up action on the joint LRCS/WMO/ESCAP missions in 1973 and 1974, including review by informal meetings as in previous years. Such informal meetings might be arranged in conjunction with the visits of the mission members to the region, particularly in Thailand as soon as possible. The Republic of Korea, Hong Kong, Japan and the Philippines could be visited in mid-1976 in conjunction with the regional training seminar in Japan;

(c) Preparation of the Guidelines on community preparedness and disaster prevention: Measures to reduce loss of life and damage caused by tropical cyclones and associated floods;

/(d)

(d) Organization of the Regional Seminar on Community Preparedness and Disaster Prevention at Tokyo and ensuring active participation by member countries including possible additional assistance of UNDRO towards travel costs. Also follow-up training programme at national level with support from LRCS/WMO/ESCAP/TC and possible assistance from UNDRO.

Training and research

(a) Completion of training with international fellowships under the UNDP project;

(b) Training of additional personnel through group training courses in Japan and other fellowships through bilateral or VAP assistance. Short-term training courses on maintenance of electronic equipment might be given special consideration;

(c) On-the-job training by TCS expert in the operation of tele-communication equipment, in calibration and maintenance of weather radar and in measurement of rainfall by radar;

(d) Stimulation of research activities through advisory services, exchange of information and joint collaboration among member countries. Special attention would be given to the studies of objective typhoon forecasting and of storm surges. Implementation of the WMO Tropical Cyclone Project was likely to provide additional impetus to typhoon research activities, particularly under subprojects in which member countries of the Typhoon Committee and TCS were associated.

Statement by the representative of the USSR

122. The representative of the USSR informed the Committee that it had carried out a considerable amount of research work in tropical meteorology, including typhoons in recent years. It had co-operated with WMO and ESCAP in carrying out a wide range of experiments associated with tropical meteorology and typhoons, such as monsoon experiments in co-operation with India (1973-1977), the programme for the launching of a GMS over the Indian ocean area in 1977, studies on typhoon in the Western Pacific in 1975. It had offered assistance to projects in southeast Asia including the establishment of a radar station in Laos and the strengthening of RTH in Thailand. Most of those activities were aimed at the mitigation of damage caused by tropical cyclones.

123. The Committee expressed its appreciation of the work being carried out by the USSR and noted the desire of the USSR to participate in the activities of the

VI. CO-ORDINATION WITH THE WMO TROPICAL CYCLONE PROJECT
AND REGIONAL PROGRAMMES
(WRD/TC.8/8)

24. The Committee noted with interest the report describing the WMO tropical cyclone Project activities and the arrangements made to ensure co-ordination with regional programmes and dissemination of information on the various activities related to tropical cyclones. Considerable interest was shown in interagency projects between WMO and UNDRO, and between WMO and UNEP, in which the current state of knowledge in typhoon monitoring and forecasting was assessed and techniques described for evaluating the disaster hazards of countries affected by tropical cyclones.

125. The Committee noted with satisfaction that many of the studies listed as subprojects of the WMO Tropical Cyclone Project had a direct bearing on the meteorological and hydrological problems which were of concern to the member countries of the Typhoon Committee. The Committee also expressed its appreciation of the resolutions adopted by the Seventh Congress of WMO (Geneva, 1975), to promote research in tropical meteorology, to encourage action to help meteorological and hydrological services to develop improved systems for monitoring tropical cyclones and giving early warning of their approach, and to ensure that adequate training programmes, including fellowships, were provided for developing countries.

126. The Committee, noting the wide scope and application of the many facets of the WMO Tropical Cyclone Project, agreed on the importance of co-ordination and of the distribution of information about activities and their progress. The Committee therefore expressed satisfaction at the initiative taken by the WMO secretariat in the issue of a status report on Tropical Cyclone Project activities, and gave strong support to the suggestion that such reports should be compiled and circulated periodically. During the discussions, a number of useful suggestions were made concerning the contents and layout of future status reports; in particular, it was suggested that a brief description of the scope of the sub-projects should be added.

VII. LIAISON WITH THE WMO/ESCAP PANEL ON TROPICAL CYCLONES
(WRD/TC.8/9)

127. The Committee received a report on the activities of the Panel on Tropical Cyclones in the Bay of Bengal and Arabian Sea. The Committee noted with satisfaction that a number of encouraging developments had recently occurred. A significant /step had

step had been taken towards setting up a Technical Support Unit for the Panel on similar lines to the Committee's secretariat by the appointment of a hydrologist whose services would be financed by means of funds generously made available by the Government of the Netherlands.

128. The Committee noted with interest the early action taken to form a fact-finding mission, consisting of the chief technical adviser of the Committee and the hydrologist designate. The mission would visit all the member countries of the Panel in the first part of 1976 and prepare a report with recommendations, which would be considered at the next meeting of the Panel, provisionally arranged for April 1976. As an indication of its wish to assist the Panel in promoting its programme as speedily as possible, the Committee had agreed to release its chief technical adviser to participate in the fact-finding mission.

129. The Committee noted with satisfaction that there were good prospects for the provision of funds by UNEP to enable the Panel to set up its Technical Support Unit from the beginning of 1976 and to initiate other important activities, possibly with the help of consultants, during that year. In that way, it would be practicable to lay good foundations for a programme which, it was planned, should begin in 1977 and for which an application would be made to UNDP for financial support.

130. The Committee had always considered its liaison with the Panel a matter of great importance and considered that the time had arrived for making firmer arrangements for such liaison. Accordingly the Committee agreed that the senior technical advisers should participate in all meetings of both the Committee and the Panel, and that it would be desirable for the meetings of the Committee and the Panel to be spaced approximately six months apart.

VIII. CONSIDERATION OF THE AGENDA FOR THE NEXT SESSION OF THE COMMITTEE

131. The Committee suggested that provision be made for an item on contribution by member countries, other countries and organizations to the Committee's technical secretariat and programme.

132. It was also agreed to request WMO, ESCAP and TCS to arrange, as on previous occasions, for at least one half day to be devoted at its next session to a technical and scientific discussion on topics which would be related to the programme of the Committee and would be selected in consultation with members, including the host country.

IX. DATE AND PLACE OF THE NINTH SESSION

133. It was decided that the ninth session of the Committee would be held in the latter part of 1976, taking into consideration the other commitments of WMO and ESCAP. The representative of the Philippines offered to explore the possibility of holding the session at Manila. The Committee welcomed the offer and agreed that it should be held there in the event of the Government of the Philippines offering to host the meeting.

X. ADOPTION OF THE REPORT

134. The report of the session was adopted at the Committee's final meeting on 17 November 1975.

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

PROVISIONAL AGENDA

1. Opening of the session
2. Election of the Chairman and Vice-Chairman
3. Adoption of the agenda
4. The Committee's activities during 1975
 - (a) Meteorological component
 - (b) Hydrological component
 - (c) Community preparedness and disaster prevention
 - (d) Training and research
5. UNDP technical support to the regional typhoon programme
 - (a) Under the 1974-1976 project
 - (i) Equipment component
 - (ii) United Nations experts and counterpart staff
 - (iii) Fellowships
 - (iv) Bilateral assistance
 - (b) UNDP support beyond 1976
6. Staffing of the Typhoon Committee secretariat beyond 1976

7. Programme for 1976

- (a) Meteorological component
- (b) Hydrological component
- (c) Community preparedness and disaster prevention
- (d) Training and research

8. Co-ordination with the WMO Tropical Cyclone Project and regional programme

9. Liaison with the WMO/ESCAP Panel on Tropical Cyclones

10. Consideration of the agenda for the next session of the Committee

11. Date and place of the ninth session

12. Adoption of the report

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FOR PARTICIPANTS ONLY

WRD/TC.8/2
6 August 1975

ORIGINAL : ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

ANNOTATED PROVISIONAL AGENDA

1. Opening of the session

The eighth session of the Typhoon Committee will be held at Sala Santitham, headquarters of the United Nations Economic and Social Commission for Asia and the Pacific, at Bangkok, from 11 to 17 November 1975.

2. Election of the Chairman and Vice-Chairman

Rule 6 of the rules of procedure of the Typhoon Committee states:
"The Committee shall, at its first meeting of the year, elect from its representatives a chairman and vice-chairman who shall hold office until their successors are elected. They shall be eligible for re-election."

3. Adoption of the agenda

The provisional agenda has been prepared by ESCAP and WMO, in close consultation with the Typhoon Committee secretariat. Representatives of participating Governments may propose additions to or changes in the agenda if they so desire.

4. The Committee's activities during 1975

A review of the activities of the Committee and its secretariat undertaken since the seventh session will be made under this item on the basis of a report prepared by the secretariat (WRD/TC.8/4).

The activities will be reviewed in relation to the four components of the action programme, namely: (a) meteorological component; (b) hydrological

component; (c) community preparedness; and (d) training and research. Representatives may wish to comment on the activities undertaken, and to report on any relevant activities in their countries not covered by the report.

5. UNDP technical support to the regional typhoon programme

The current UNDP project began on 1 January 1974 and will continue until the end of 1976. The UNDP contribution is made up of equipment, expert services and fellowships. The project calls for the receiving countries to provide counterpart staff and other facilities, and for a matching equipment component obtained from bilateral sources. Document WRD/TC.8/6 will give the Committee up-to-date information on the progress achieved for each of the above aspects of the project and will also outline the further activities to be undertaken in the last year of the project.

6. Staffing of the Typhoon Committee secretariat beyond 1976

At its seventh session, the Committee gave preliminary consideration to its possible needs for further UNDP support after the termination of the present project. It felt that it would need the services of an internationally recruited senior technical adviser for some years to come and also drew attention to its requirements for consultant services in community preparedness and disaster prevention.

Offers made by member countries during the seventh session of the Committee give sound reason to expect that some professional staff will be available in the Typhoon Committee secretariat during the next two to three years. It should, however, be recognized that there is at present no guarantee that TCS can be staffed at its present level beyond the end of 1976. Existing offers relate to the services of a meteorologist and a hydrologist and there are no plans, for example, to provide a telecommunications or electronics expert. The increased availability of storm-warning radar, satellite-reception and other electronic equipment in member countries would appear to make the services of such an expert, at least on a consultancy basis, highly desirable.

It is also suggested that the Committee may wish to look beyond the next two to three years with a view to drawing up a plan that would ensure the uninterrupted staffing of TCS for a reasonable period, say, five to eight years. Member countries are accordingly urged to reconsider their possible contribution to the provision of counterpart staff with a view to making more definite commitments at the eighth session. These questions will be dealt with in greater detail in document WRD/TC.8/7 submitted to the session.

7. Programme for 1976

The action programme adopted at the first session continues to guide the main lines of the Committee's activities. In addition, the UNDP project contains a planned work programme for the years 1974-1976. It has become the practice in recent years for the Committee, at each session, to make a selection of specific items of work on which it wishes to concentrate during the following year. To assist the Committee, a tentative programme of work for 1976 is submitted for consideration in document WRD/TC.8/5.

8. Co-ordination with the WMO Tropical Cyclone Project and regional programmes

The developments in the WMO Tropical Cyclone Project and its associated regional programmes will be reported to the Committee under this item. As a follow-up action on paragraph 59 of the report of the second session of the WMO/ESCAP Panel on Tropical Cyclones and taking into account the views expressed by members of the Typhoon Committee at its seventh session (see paragraphs 99 to 103 of the report of the session), the WMO secretariat has distributed in July 1975 to all concerned a Status Report on the implementation of the WMO Tropical Cyclone Project. A document prepared for the eighth session (WRD/TC.8/8) gives further information on the global and regional activities under the Project. Reference is also made to the plans for the RA I Tropical Cyclone Committee for the South-West Indian Ocean to have its third session by mid-1976.

The document on this item will also provide information on plans and implementation of other related projects to be conducted or being conducted in co-operation with other organizations, such as the WMO/UNEP Project on "Quantitative evaluation of disaster risks" (Phase I) and the UNDP project on "Study of the state of art in disaster prevention and mitigation".

The document is mainly intended to provide information on these activities in other tropical cyclone areas. However, because of their close relationship to the programme of the Typhoon Committee, it is felt that the Committee may wish to review the effectiveness of the present arrangements for the co-ordination of such activities and the exchange of information thereon.

9. Liaison with the WMO/ESCAP Panel on Tropical Cyclones

With the development of an active programme by the WMO/ESCAP Panel on Tropical Cyclones, there is an increasing need for close liaison between the

Panel and the Typhoon Committee in order to ensure maximum effectiveness in the work of both bodies. Document WRD/TC.8/9 will give an outline of developments in the work of the Panel and put forward proposals for such liaison.

10. Consideration of the agenda for the next session of the Committee

To conform to the ESCAP conference requirements as set forth by the Advisory Committee of Permanent Representatives, the Committee is requested to draw up a provisional version of the agenda it would wish to consider at its ninth session. It should be understood that this agenda may be added to or changed at any time.

11. Date and place of the ninth session

Rule 1 of the Committee's rules of procedure states: "The Committee should hold at least one session annually. The venues and dates of its sessions shall be decided by the Committee."

12. Adoption of the report

The report of the eighth session of the Committee should be adopted at its final meeting.

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

NOTES FOR THE INFORMATION OF PARTICIPANTS

Schedule of meetings

1. The eighth session of the Typhoon Committee will be opened at 10:00 hours on Tuesday, 11 November 1975, at Sala Santitham, headquarters of The Economic and Social Commission for Asia and the Pacific, where all subsequent sessions will also be held.

2. Subject to confirmation by the meeting, the daily schedule, except for the opening session, will be as follows:

Monday through Friday	0930 to 1230 hours 1430 to 1700 hours
Saturday	0930 to 1300 hours

Registration

3. A registration desk will be located outside the committee room. Participants are requested to be at the lobby outside the committee room between 0900 and 0945 hours on the opening day, in order to allow time for registration.

Badges

4. On obtaining their identification badges after registration, participants are requested to wear them at all meetings and official functions.

OFFICERS CONCERNED WITH THE MEETING

5. The substantive Division concerned with the meeting is the Division of Natural Resources. Mr. Arthur I. McCutchan is the Chief of the Division.

6. The Division of Administration is responsible for the physical arrangements for the meetings. Mr. C. Roy Smith is the Chief of Division.

/RECEPTION

RECEPTION ON ARRIVAL

7. Provided that advance notice is given, participants will be met on arrival at the Bangkok Airport by a staff member of ESCAP, who will assist them in going through the customs and immigration formalities. Arrangements will also be made for transportation to their respective hotels.

8. To facilitate reservation of hotel accommodation and to arrange for reception on arrival, participants are requested to furnish the following particular at least seven days in advance to Mr. C. Roy Smith, Chief, Division of Administration, ESCAP, Sala Santitham, Bangkok. (Cable Address: ESCAP, BANGKOK)

- (a) date and time of arrival,
- (b) airline and flight number,
- (c) hotel accommodation requirements,
- (d) whether entry visa required on arrival,

HOTEL ACCOMMODATION

9. Accommodation will be reserved at the request of participants at the Majestic Hotel, Royal Hotel, Thai Hotel, R.S. Hotel or Viengtai Hotel, which are located close to Sala Santitham.

Tariffs of room rents at these hotels are furnished below:

Majestic Hotel: All rooms with air-conditioning

Rates per day:	Single	Bht 120.00	(net)
	Double	Bht 160.00	(net)

Royal Hotel: All rooms with air-conditioning

Rates per day:	Single	Bht 160.00	(net)
	Double	Bht 200.00	(net)

Thai Hotel: All rooms with air-conditioning

Rates per day:	Single	Bht 140.00	(net)
	Double	Bht 180.00	(net)

R.S. Hotel: All rooms with air-conditioning

Rates per day:	Single	Bht 165.00	(net)
	Double	Bht 242.00	(net)

Viengtai Hotel: All rooms with air-conditioning

Rates per day:	Single	Bht 141.90	(net)
	Double	Bht 189.20	(net)

Charges for all meals, including breakfast, will be extra and may amount to about Baht 150.00 per day. Room rents and meal charges are subject to a 10 per cent service charge. The hotel room rents are subject to alteration without prior notice.

/IRRIGATION

IMMIGRATION REQUIREMENTS

10. Participants are required to possess a valid passport and an entry visa for Thailand, obtainable at any Thai diplomatic or consular mission. Arrangements can be made to issue visas on arrival at the airport to those who come from countries where Thailand has no mission. In such cases, particulars as to name, nationality, passport number, and nature of passport (namely, diplomatic, special, official or ordinary) should be furnished at least seven days in advance of the arrival date.

HEALTH REQUIREMENTS

11. Participants are required to obtain a certificate of vaccination against small-pox and inoculation against cholera at least ten days before their departure from their respective countries. They are, however, advised to consult travel agents in their own countries at least two weeks in advance of their departure, in order to obtain up-to-date information on these requirements.

LOCAL TRANSPORTATION

12. Transportation will be provided by ESCAP to participants staying at the hotels listed in paragraph 9 to attend the meetings. ESCAP transport will call for them at their hotels on the opening day of the meeting between 0845 and 0855 hours, and half an hour in advance of the meeting time on other days. For private transportation requirements, taxis are available. As meters are not used, it is advisable to fix the fare beforehand.

FOREIGN EXCHANGE

13. Participants may bring with them pound sterling or US dollar traveller's cheques or bank drafts, which can be exchanged for Thai currency at the prevailing bank rates. The exchange rates, which fluctuate from time to time, are approximately as follows:

US\$ 1.00 = Bht 20.25

£ 1.00 = Bht 43.35

Exchange facilities are available at the hotels as well as the Sala Santitham Branch of the Siam Commercial Bank Ltd., which is open from 0900 to 1200 hours and 1300 to 1500 hours from Monday through Friday, except on official holidays.

/WEATHER

WEATHER

14. The climate of Bangkok during November is usually humid and warm with occasional showers. A daily mean temperature of about 26.9°C (80.4°F) can be expected. The average daily maximum will be about 31°C (87°F), the average daily minimum 23°C (73°F). The mean monthly rainfall is 40 mm (1.9 inches).

COMMUNICATIONS

15. Mail intended for participants should be addressed as follows:

Mr.
c/o Natural Resources Division
ESCAP Secretariat
Sala Santitham
Bangkok-2, Thailand
Cable address: ESCAP BANGKOK.

POSTAL FACILITIES

16. A post office is located on the ground floor of Sala Santitham. Its working hours are from 0830 to 1630 hours (without lunch break) from Monday through Friday, and 0900 to 1100 hours on Saturday, except on official holidays.

FIRST-AID FACILITIES

17. The ESCAP first-aid room is located in Room No.... on the first floor of the main building of Sala Santitham. The nurse, Miss Surabhi Kandranakamala, can be contacted by telephone No. 813544, extension 293.

LUNCH AND REFRESHMENTS

18. Tea, coffee, soft drinks and other light refreshments are available in the Delegates Lounge at Sala Santitham during meeting hours. The ESCAP Cafeteria has been closed during the construction of the new building. Transport will be provided for delegates to their hotels for lunch and from their hotels to Sala Santitham after lunch.

WORKING LANGUAGE

19. The working languages of the meeting will be English and French.

DOCUMENTS

20. Some of the documents for the meeting will be supplied to participants in advance. Others will be distributed as they are issued during the meeting. In view of the limited number of copies available, it will be appreciated if participants bring with them the sets of documents supplied in advance.

/LIBRARY

LIBRARY FACILITIES

21. The facilities of the ESCAP library are available to participants. Publications can be consulted in the library but may not be taken out of Sala Santitham. The Library is located in the Assembly Hall Area. The Librarian, Mrs. Z. Polite, can be reached by telephone No. 813544, extension 201.

WORKING HOURS OF THE ESCAP SECRETARIAT

22. The working hours of the ESCAP secretariat are from 0730 to 1545 hours with a break of 45 minutes for lunch at midday - Monday through Friday. The servicing staff connected with the conference will, however, be available during meeting hours.

MICROPHONES

23. Sound equipment is provided in the Conference Room. All microphones on the table are controlled by the operator at the control desk. Before making speeches, participants are requested to push the button on their microphones until the red signal light glows.

AIRLINES

24. As a number of international airlines operate regular services to Bangkok, participants should have no difficulty in booking their return air passages soon after arrival. They are advised to make firm bookings well in advance whenever possible.

UNITED NATIONS
ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND

WORLD METEOROLOGICAL ORGANIZATION
EIGHTH SESSION OF THE TYPHOON COMMITTEE

11-17 November 1975

Bangkok, Thailand

Address replies to:

Mr. C. Roy Smith
Chief
Division of Administration
ESCAP, Sala Santitham
Bangkok-2, Thailand

Cable address: ESCAP BANGKOK

ATTENDANCE INFORMATION

(Please type or print)

Copies of this form should be completed by or on behalf of each participant who will attend the eighth session of the Typhoon Committee and returned promptly to the above address.

1. NAME _____
(As it should appear in official listings)
2. TITLE OF PRESENT OFFICIAL POSITION _____
(In home country or official duty station)

3. PERMANENT MAILING ADDRESS _____

4. COUNTRY/ORGANIZATION REPRESENTED _____

5. WILL ATTEND THE WORKING GROUP SESSION AS:

REPRESENTATIVE _____

ALTERNATE _____

ADVISER _____

OTHER _____

6. ACCOMPANIED BY FOLLOWING MEMBERS OF FAMILY

Name	Relationship	Age if under 18
_____	_____	_____
_____	_____	_____

7. DATE OF ARRIVAL IN BANGKOK, CARRIER AND FLIGHT NUMBER:

8. PLEASE RESERVE LIVING ACCOMMODATION IN BANGKOK AS INDICATED BELOW:

(All rooms and suites will be assigned according to information furnished herewith and on a first-come first-served basis)

ROOMS: Single _____ Double _____

SUITES: _____

NAME OF HOTEL: _____

CHECK-IN DATE: _____

CHECK-OUT DATE: _____

Note: It is essential that any change in plans, i.e., arrival date, accommodation required, etc., be communicated to Mr. C. Roy Smith, Chief, Division of Administration, ESCAP at the address shown above. Rooms not occupied in accordance with latest advice to him will be held 24 hours at participant's expense and then released.

9. IF MAKING OWN LIVING ARRANGEMENTS IN BANGKOK, PLEASE INDICATE ADDRESS IN BANGKOK AND DATES OF ARRIVAL AND DEPARTURE:

(Date)

(To be signed by participant)

FOR PARTICIPANTS ONLY

WRD/TC.8/4
18 September 1975

ORIGINAL : ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

THE COMMITTEE'S ACTIVITIES DURING 1975

(Item 4 of the provisional agenda)

Preceded by a brief account of the seventh session

Note by the Typhoon Committee secretariat

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I. SEVENTH SESSION OF THE TYPHOON COMMITTEE

1. The seventh session of the Typhoon Committee was held at Manila from 8 to 14 October 1974 and was attended by representatives of all seven member countries. Representatives of France, the Union of Soviet Socialist Republics and the United States of America attended as observers. A representative of the United Nations Development Programme (UNDP) and observers from the League of Red Cross Societies (LRCS) and the Committee for Co-ordination of Investigations of the Lower Mekong Basin were also present.

2. The Committee reviewed the progress that had been made since its previous session and took stock of the current state of implementation of the meteorological, telecommunication, hydrological and other facilities required for an efficient system for the mitigation of typhoon damage. A revised priority list of observing and telecommunication facilities still required in the typhoon area was drawn up. A programme of work for 1975 was also agreed upon.

3. The Committee noted with satisfaction that UNDP had approved the project entitled "Technical support to the regional typhoon programme" for the period 1974-1976 and that good progress had been made in 1974 in the implementation of the project. The expert component had been fully implemented; most of the equipment to be provided by UNDP under the project was under procurement and arrangements for implementation of the fellowships were in progress. The Committee also gave some preliminary consideration to its possible need of UNDP support beyond 1976.

4. The Committee reviewed the bilateral assistance received during 1974 and welcomed fresh offers of assistance in support of the typhoon programme. It noted with appreciation that the pilot flood forecasting system in the Republic of Korea had been established with the assistance of a Japanese Government loan amounting to \$US 1.5 million. The Committee was also pleased to learn that Japan was ready to provide technical assistance by sending a survey mission to Laos and Thailand in connexion with the development of pilot flood forecasting systems in those countries. The assistance provided by the Federal Republic of Germany in furnishing facsimile equipment worth \$US 100,000 to Thailand was noted with appreciation. The Committee welcomed the news that the Government of the USSR would implement two VAP projects in the typhoon area. The plan of the USSR to operate four research vessels in the Western Pacific in 1975 for studying typhoons was also noted with satisfaction.

5. Significant progress was reported in the area of community preparedness and disaster prevention activities. A detailed report of the second joint LRCS/UNO/ESCAP mission to Japan and the Philippines was considered by the Committee.

Follow-up action taken or initiated on the basis of the recommendations of the first joint LRCS/WMO/ESCAP mission to Hong Kong, the Republic of Korea and Thailand in 1973 and the second joint mission to Japan and the Philippines in 1974 was also reviewed.

II. ACTIVITIES DURING 1975

6. At the thirty-first session, held at New Delhi in March 1975, ESCAP considered the report of the Typhoon Committee on its seventh session. The Commission noted with satisfaction that significant progress had been achieved in the implementation of its meteorological and hydrological programmes, in community preparedness and disaster prevention and in training associated with those activities. It noted with appreciation that such progress was due mainly to the assistance provided by several countries inside and outside the region and by UNDP, and to the co-operation between WMO, LRCS and ESCAP in assisting the Committee in its work. It was noted in that connexion that WMO, through its Voluntary Assistance Programme (VAP), had contributed over US\$ 2 million in the form of equipment and expert services to work associated with Typhoon Committee.

7. The UNDP project "Technical support to the regional typhoon programme" began on 1 January 1974 and will continue until the end of 1976. The UNDP contribution, totalling US\$ 662,000, is made up of equipment, expert services and fellowships. The project calls for receiving countries to provide counterpart staff and other facilities, and for a matching equipment component from bilateral sources. Document MRD/TC/6 gives up-to-date information on the progress achieved for each of the above components.

8. The second session of the WMO/ESCAP Panel on Tropical Cyclones was held at Colombo from 18 to 23 December 1974. The Chief Technical Adviser of TCS participated in this session as an observer. It provided an opportunity for the exchange of information and for collaboration between the two regional cyclone programmes.

9. In the period between the seventh session and the time of preparing this document, the Typhoon Committee secretariat (TCS) experts made official missions to member countries, the ESCAP secretariat and also to two non-member countries as indicated below:

- (a) Mr. S.M. Sen : Colombo, 16-23 December 1974; Bangkok, 1-14 February 1975; Kuala Lumpur, Bangkok, Hong Kong, 21 June-5 July 1975.
- (b) Mr. C.H. Tano : Bangkok, Vientiane, 20 November-12 December 1974; Cebu, 9-11 May 1975; Seoul, Tokyo, 23 June-10 July 1975.
- (c) Mr. A. Hamamori : Bangkok, Vientiane, 23 January-10 February 1975; Tokyo, Seoul, 6-17 April 1975.

10. Representatives of the WMO and ESCAP secretariats visited Manila from 11 to 13 June 1975 and discussed with TCS various matters concerning the Typhoon Committee's activities, including preparations for its eighth session.

1. METEOROLOGICAL COMPONENT

1. Status of meteorological observing and telecommunication systems

11. As at previous sessions, the Committee will examine the degree to which the meteorological and telecommunication facilities essential to efficient typhoon warning services have been implemented in the member countries. The review will be based essentially on facilities forming part of the World Weather Watch (WWW) and on the priorities established at the seventh session.

12. The information presented in annexes I-IV is intended to assist the Committee in reviewing this part of the programme. Annexes I-III summarize the deficiencies in respect of upper-air stations, storm warning radar and Automatic Picture Transmission (APT) stations, together with brief remarks on the outlook for their implementation over the next few years. Annex IV summarizes the state of implementation and further plans for those facilities included in the revised priority list established at the seventh session.

13. The Committee may wish to review the deficiencies listed in the annexes and consider possible means of speeding up action where appropriate. Notification at the session of any corrections, addition and changes to the information furnished in the annexes will be appreciated.

2. RS/PW, radar and APT stations

14. In accordance with the Committee's recommendation, the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) made special efforts to record regular observations at three RS/PW stations (Cebu, Clark and Laoag). During the first half of 1975, more than 80 per cent of the 00 GMT observations at Cebu were made and transmitted. The corresponding figure for Laoag observations

/was lower

was lower (about 60 per cent), mainly owing to shortage of hydrogen gas. The ground equipment for the RS/RV station at Zamboanga was delivered in June 1975 and observations were expected to commence before the end of 1975.

15. The 20-cm radars at Baguio, Cebu, Daet and Virac and the 5.6-cm radar at Manila continue to be operational in the Philippines. The 10-cm radar at Guisan was brought into regular operation in July 1975. As regards the 10-cm radar at Basco (included in the priority list), the building and tower are under construction and the radar is expected to be operational in the near future. Two more 10-cm radars are to be installed at Tagaytay (60 km south of Manila) and at Aparri (northern tip of Luzon) during 1976.

16. Preparations continued for installation of a 10-cm radar at Bangkok through national resources. It is expected to be installed in early 1976.

17. The 10-cm radar at Mt. Kwanaksan, Seoul, and the auxillary display unit at the Central Meteorological office were adjusted to optimum operational condition by using the radar test equipment received under the UNDP project. The telecommunications and electronics expert of TCS assisted the radar technicians in these adjustments.

18. Regarding the establishment of a 10-cm radar station at Vientiane, for which the Government of the USSR had announced its readiness to offer assistance under VAP, it was understood that WMO was consulting the Hydrometeorological Service of the USSR concerning arrangements for implementation of this project.

19. The seventh session was informed that APT equipment would soon be supplied by the United States under VAP for installation at Phnom Penh. The equipment was delivered in January 1975.

3. Telecommunication system

20. TCS submitted a detailed report to the Administrator of PAGASA in 1974 with recommendations for improvement of the meteorological telecommunication facilities for national data collection in the Philippines. The programme of improvement of national data collection was actively pursued. Additional frequencies were allotted for this purpose and 20 pieces of 3,650-kc crystals were procured. However, installation of a new antenna was awaiting necessary budgetary provision. Twenty new sets of 100-W SSB transceivers were procured by early 1975 and some of these were being used at selected observing stations.

/21. Two

21. Two 10-kW medium wave transmitters were procured and installed at Manila in the first half of 1975 for regular operation of a broadcast station under the direct control of PAGASA. The broadcast of hourly weather information from 5 a.m. to midnight, together with other official information issued by the office of Civil Defense and the Department of Public Information (excluding commercial programmes), began on 1 July 1975. This Broadcast station will be used for prompt dissemination of typhoon warnings.

22. A revised VAP request amounting to \$US 178,000 for improvement of telecommunication facilities in the Philippines, mainly aimed at collection of radar pictures at Manila from remote radar stations, was approved by WMO for circulation in 1974. France has been offered to provide two SSB transceivers for the partial implementation of the project.

23. The Manila-Tokyo point-to-point circuit started regular operation from 1 October 1974. Since then the circuit has been functioning quite satisfactorily and recent statistics show that reliability of data exchanges on this circuit is 98.5 per cent.

24. The Peking-Hong Kong regional telecommunication link was expected to be implemented in the near future. Formats, contents and procedures for data exchange were under consideration by correspondence.

25. In connexion with the proposed assistance offered to Laos by Japan in the form of SSB equipment and spare parts for improving national data collection, and in accordance with the committee's recommendation at its seventh session, the telecommunications and electronics expert of TCS conducted a survey in Laos during November-December 1974. A detailed report on the survey with recommendations was submitted to Japan in January 1975. The equipment, comprising 5 sets of 100-W SSB with antenna and accessories, was expected to be delivered by the end of 1975.

26. The Bangkok-Vientiane point-to-point circuit was established in 1974 with VAP assistance to Laos by the USSR. The antenna provided by France under bilateral assistance was used initially for this circuit. The USSR supplied the required antenna and other accessories to Laos in January 1975, when a Soviet expert visited Vientiane.

27. In connexion with the strengthening of the Bangkok RTH, facsimile transmitters and receivers worth US\$ 100,000 were received at Bangkok under bilateral aid from the Federal Republic of Germany. The equipment was installed in December 1974 at

/the central

the central and airport meteorological offices at Bangkok and at the regional centres in Chiangmai, Ubon and Songkhla. The installations were completed with the assistance of a German expert deputed for this purpose. The Federal Republic of Germany also offered fellowships for the training of two technicians.

28. A revised VAP request for the remaining equipment required for the strengthening of the Bangkok RTH comprises two parts, TE/5/2: telecommunication equipment costing US\$ 141,500; and TE/5/3: Automation of the RTH, costing US\$ 390,000. Latest information from WMO shows that discussions were in hand with potential donors regarding project TE/5/2, but no offer of support has yet been made for project TE/5/3.

29. In accordance with the recommendation of the seventh session, a review of the existing telecommunication facilities and current efficiency of data exchange was undertaken. TCS issued a circular to member countries suggesting suitable formats for the compilation of relevant statistics for periodical scrutiny. The replies received from members were being examined by TCS.

30. Hong Kong reported inadequacy of data received from the Pacific island stations, Indonesia and New Guinea. TCS examined the matter with reference to the current transmission schedules; and it was also discussed by TCS experts during their visits to Tokyo, Hong Kong, Bangkok and Kuala Lumpur. A report based on these consultations was being prepared by TCS for transmission to Hong Kong.

4. Other meteorological activities

31. The review paper on techniques for typhoon forecasting prepared by the Chief Technical Adviser was revised by incorporating additional information collected during discussions of the paper in various countries. The revised paper was distributed to the member countries and to the WMO and ESCAP secretariats. Additional copies were furnished to WMO for distribution to other countries concerned with tropical cyclone forecasting.

32. The seventh session was informed that the Japan Meteorological Agency (JMA) had published a manual on typhoon forecasting (in Japanese) in 1974. In view of its usefulness to other meteorological services, the Committee expressed the hope that it could be translated into English. TCS followed up the Committee's recommendation by sending a letter to JMA. The latest information from Japan shows that the English version of the manual is expected to be prepared and distributed to member countries of the Typhoon Committee in 1976.

33. In accordance with the recommendation of the seventh session of the Committee on the Global Data Processing System (GDPS), TCS undertook a review of the output products of the regional meteorological centres (RMCs) to ascertain whether they fully meet the requirements for typhoon warnings. TCS issued a circular letter to member countries on this subject.

5. Action on decisions adopted at the seventh session

(a) Soviet offer of VAP assistance (paragraph 13)^{1/}

34. Information available at the time of preparing this document has been reflected in paragraphs 16 and 28.

(b) Ocean weather ships in the western Pacific (paragraphs 16-17)

35. The seventh session noted with interest that the USSR would operate four research vessels in the western Pacific in 1975. WMO wrote to the Hydrometeorological Service of the USSR in June 1975 seeking information on the programme of operations and observations of the Soviet research vessels.

36. Japan announced that surface and upper air observations would be carried out at the ocean weather station "Tango" (29°N, 135°E) during May-October 1975 and that the KEIFU MARU would be operated at 20°N, 130°E during July-August 1975, and near Torishima island during September 1975.

(c) Automatic marine buoy (paragraph 18)

37. A Japanese ocean buoy (No.3) installed in November 1974 at 25°40'N, 135°55'E continued to be operational in 1975. Ocean buoy No. 4 installed in September 1974 at 28°20'N, 126°05'E was brought back in May 1975 for routine inspection and was expected to be reinstalled at the same location in August 1975. A new ocean buoy (No. 5) was to be installed at 37°N, 147°E in July 1975.

(d) Priorities for the implementation of observing and telecommunication facilities (paragraph 23)

38. TCS maintained close contacts with countries, both by correspondence and by visits of its experts, with a view to expediting implementation of the recommended facilities. Where bilateral or VAP assistance was offered, representatives of prospective donor countries or the WMO secretariat were consulted and the receiving country advised on further action.

^{1/} This and subsequent references to paragraphs relate to the report of the Committee on its seventh session (E/CN.11/1180).

(e) Typhoon forecasting techniques (paragraph 25)

39. Revision and distribution of the review paper on techniques of typhoon forecasting have been reported in paragraph 31. Further developments regarding translation of the Japanese manual on typhoon forecasting has been reported in paragraph 32.

(f) Exchange of radar fixes (paragraph 28)

40. Radar fix messages were exchanged between the member countries as in previous years. Hong Kong reported that, during the period November 1974-June 1975, three tropical cyclones came within its radar range and altogether 16 radar fix messages were issued. Hong Kong's analysis showed that it should have received radar fixes for seven tropical cyclones during the same period from other radar stations but the number of reports actually received was much less than that to be expected on a three-hourly reporting basis.

(g) Meteorological reconnaissance flights (paragraphs 30-31)

41. The reconnaissance flights by United States aircraft in the typhoon area continued to provide valuable information for typhoon warning services.

42. It may be recalled that the seventh session recorded its deep regret at the loss of a United States reconnaissance aircraft and its crew members on 12 October 1974 while tracking typhoon Gess in the South China Sea. On behalf of the Typhoon Committee, TCS wrote a letter to the Commander of the USAF 54th Weather Reconnaissance Squadron, Guam, conveying the Committee's deep regret.

(h) Meteorological satellites (paragraphs 32-34)

43. Japan continued its preparations for launching the GMS satellite at 140°E in June 1977. A pamphlet on "Data collection and dissemination by GMS of Japan" was circulated at the seventh session. Any additional information of interest to the member countries may be presented by the Japanese delegation at the session.

44. NOAA-4 satellite was successfully launched by the United States on 15 Nov 74. It became operational in December and continued to provide direct readout services (APT, HRPT and VTPR). The Satellite Data Processing System (SDPS) developed by JMA continued to be used for reducing the distortion of NOAA satellite pictures, which were retransmitted by facsimile broadcast. The pictures received from NOAA-4 through SDPS and broadcast by JMA could be intercepted by other countries using ordinary radio facsimile.

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45. To remedy the distortion of NOAA satellite pictures, the United States suggested modification of APT receivers. It also reported that scan linearization devices on board its future spacecraft were being considered to alleviate the difficulties being experienced at present by many APT stations throughout the world.

6. Further action proposed

46. It is suggested that the Typhoon Committee may wish to:

- (a) Examine the information contained in the annexes, especially in regard to the state of implementation of the facilities to which priority was assigned at the seventh session;
- (b) Revise the list of priorities;
- (c) Recommend further measures to expedite implementation of meteorological and telecommunication facilities;
- (d) Express its appreciation to the USSR for its readiness to assist VAP projects in the typhoon area;
- (e) Express appreciation to Japan for its readiness to provide assistance to Laos by supplying telecommunication equipment for the improvement of national data collection;
- (f) Record its appreciation to JMA for agreeing to undertake the translation into English of its manual on typhoon forecasting;
- (g) Welcome the information that the review paper on typhoon forecasting techniques prepared by TCS has been revised and distributed to countries concerned with tropical cyclone forecasting;
- (h) Reiterate the importance of typhoon reconnaissance flights and express the hope that the United States will continue its valuable contribution by such reconnaissance flights.

B. HYDROLOGICAL COMPONENT

1. General activities

47. Further progress has been made in developing comprehensive plans for and the establishment and improvement of pilot flood forecasting and warning systems in the key river basins selected for this purpose in Laos, the Philippines, the Republic of Korea and Thailand. Some preparations for extending flood forecasting systems to cover other river basins have also been made. Developments during 1975 are summarized below:

(a) Laos

48. In response to a request by the Government of Laos, the Government of Japan sent a team of experts to Laos in January 1975 to make a preliminary

survey for the establishment of a pilot flood forecasting system in the Se Bang Hieng River basin. The team first visited the Philippines to collect information from TCS and to inspect the Pampanga flood forecasting system. A note prepared by TCS in 1974 on flood forecasting in the Se Bang Hieng River basin was made available for consideration by the team. The hydrologist and flood forecasting expert of TCS joined the Japanese team in carrying out the survey in Laos. The joint survey team stayed a few days in Bangkok for consultations with the ESCAP and Mekong Committee secretariats. During its 11-day stay in Laos, the team conducted a reconnaissance survey of the river basin, collected various data and made a preliminary analysis of them.

49. In view of the inadequacy of hydrological data for study of the characteristics of the Se Bang Hieng River the survey team made an interim recommendation that the hydrological observation network be expanded. The recommendation was accepted by the Government of Laos.

50. The data collected by the survey team were further analysed in Japan and a report on the survey was drafted with the assistance of the TCS hydrologist in April 1975. The report included suggestion for a step-by-step implementation of the flood forecasting system. At the time of preparation of this document, the survey preport which was originally prepared in Japanese, was being translated into English.

(b) Philippines

51. Some of the stations in the Pampanga flood forecasting system required repairs or improvement works. Staff members of the Flood Forecasting Centre were engaged in these works with the technical assistance of a Japanese telecommunication expert. The assignment of this expert was extended to cover the flood season of 1975 in compliance with a request of the Government of the Philippines. The flood forecasting system, except the monitor station which was damaged by a fire, was in working condition. There has not been any flood so far during the current year.

52. It was unfortunate that the monitor station of the Pampanga flood forecasting system located in the Bureau of Public Works was damaged by a fire in December 1974. Action to restore the station was taken by BPW immediately after the incident and a detailed estimate of the cost involved was furnished by the Japan Radio Company, the manufacturer of the original equipment. Manufacturing of new equipment and repair work were expected to be completed before the flood season in 1976.

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53. The Government of Japan assigned a senior hydrologist to the Philippines for a month during August-September 1974 as a provision for preparing an operational manual for the Pampanga flood forecasting system. The data collected during his stay were analysed in Japan and the manual was expected to be printed by the end of August 1975. The Government of Japan further made arrangements for dispatching a mission which would bring the operation manual for explanation and at the same time review the forecasting system. Recommendations on the future operation, maintenance and expansion of the system were expected to be given by the review mission.

54. TCS prepared a technical note on flood forecasting in the Pampanga River basin which contains a summary of technical developments, achievements so far, problems yet to be solved and proposals for future improvement of the system. It is hoped that this note will serve as consolidated reference material for Government officials engaged in flood forecasting and also for the Japanese review mission expected to visit the Philippines before the end of 1975.

55. The representative of the Philippines at the seventh session indicated that flood forecasting would be extended to include the Agno and Marikina basins. In November 1974, a preliminary survey of the flood forecasting in the Agno River basin was undertaken jointly by representatives of PAGASA, BPW, TCS and the Japan International Co-operation Agency. Based on this survey, and taking into account some additional material collected later, the TCS hydrologist prepared a preliminary note on flood forecasting in the Agno River basin. The note includes a proposal for a tentative system of flood forecasting with maximum possible time advantage and also a simplified system for initial implementation.

(c) Republic of Korea

56. The Ministry of Construction (MOC) prepared detailed instructions for implementation of the Han River flood forecasting system and these instructions were effective from April 1975. Further, MOC prepared a method for the optimum operation of the five dams in the basin during floods, so that in certain cases

/an advance

an advance release of water stored in the reservoirs could be ordered by the National Disaster Control Center. The method was ready for trial application during the flood season of 1975. Flood forecasting rehearsals were carried out before the flood season.

57. It was expected that the Government of Japan would offer, upon request by the Government of Korea, a grant amounting to US\$ 500,000 for supply of additional equipment and spare parts for maintenance and improvement of the forecasting system.

58. The preliminary design for expanding the flood forecasting system to other river basins was reported at the seventh session of the Committee. However, establishment of flood forecasting systems for the Keum and Nakdong River basins was postponed indefinitely in order that all efforts and resources available could be concentrated on the Han River system. It was hoped that, once the Han River system was completed and proven efficient, the forecasting system would be extended to cover the Keum and Nakdong River basins.

(c) Thailand

59. In view of the various stages of development already achieved in the evolution of a flood forecasting system in the Maeklong River basin, TCS summarized the past activities and results so far obtained in a technical note. The note prepared by the TCS hydrologist in December 1974 was distributed to the agencies concerned. It provided useful reference material for the preliminary survey undertaken by Japanese experts in early 1975.

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60. In accordance with the request of the Government of Thailand, the same team of Japanese experts that undertook the preliminary survey of the Se Bang Hieng River in Laos proceeded to Thailand and conducted a similar survey of the Maeklong River basin in February 1975. Representatives of the Meteorological Department, the Royal Irrigation Department (RID) and the Electricity Generating Authority of Thailand participated in the survey. The TCS hydrologist also joined the survey and assisted the team in its planning and in analysis of the available information.

61. As a result of the survey it was evident that an exclusive reporting system would be needed for the effective operation of flood forecasting and that a VHF telemetering system would be desirable since SSB was so widely used in the area concerned and the allocation of preferred frequency bands might be very difficult to obtain.

62. The data collected during the survey was analysed in Japan and a report prepared. The TCS hydrologist participated in the preparation of this report which was being printed at the time of drafting this document.

63. The case study of past floods of the Kwa Noi River was continued by RID. A study of the effect of a reduced number of rain gauges was also undertaken in preparation for designing a forecasting network with a minimum number of reporting stations. Similar arrangements to those in 1971 were made for trial flood forecasting by the Meteorological Department and RID in 1975.

2. Action on decisions adopted at the seventh session

64. The action taken on the decisions contained in paragraphs 37-46 of the report of the seventh session regarding the establishment and implementation of flood forecasting systems in Laos, the Philippines, the Republic of Korea and Thailand has been described in the preceding section.

3. Further action proposed

65. It is suggested that the Typhoon Committee may wish:

(a) To record its appreciation of the valuable assistance provided by the Government of Japan in:

(i) Sending a team of experts to make preliminary surveys for the establishment of pilot flood forecasting systems in Laos and Thailand;

/(ii)

(ii) Providing expert services for the operation and maintenance of the Pampanga flood forecasting system in the Philippines;

(b) To consider the steps so far taken in respect of pilot flood forecasting systems in Laos and Thailand and suggest means of expediting their implementation.

C. COMMUNITY PREPAREDNESS AND DISASTER PREVENTION

1. General activities

66. A number of new activities have been initiated in 1975 as part of this component of the Committee's programme. These new activities, together with follow-up action consequent upon earlier measures, have ensured that the impetus gained in recent years could be maintained. The paragraphs which follow summarize the main events of the past year under this heading.

(a) Joint LRCS/WMO/ESCAP Missions

67. Following its examination of the report of the Second Joint Mission to the Philippines and Japan in May/June 1974, the seventh session of the Committee reiterated its view that similar visits should be made to the remaining member countries as soon as possible. Whilst expressing its doubt on the feasibility of visiting Cambodia and Laos in 1975, the Committee requested LRCS, WMO and ESCAP to keep the matter under review and to make proposals to the countries concerned for a joint mission at the earliest feasible time. However, political changes in the area concerned have precluded any possibility of a joint mission in 1975. The Committee may wish to discuss this matter further.

68. On the other hand, the Joint Mission has been able to take useful steps to follow up its earlier work in the countries visited in 1973 and 1974. The informal talks it held with representatives of the national agencies in Thailand were reported to the seventh session. Early in 1975 serious flooding occurred in southern Thailand, causing heavy loss of life and severe damage. The opportunity was taken to approach the Government of Thailand with a view to activating the Task Force set up under the National Committee for Disaster Preparedness. It is hoped that the representative of Thailand will provide the Committee at its eighth session with further information on the outcome of this approach.

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69. As reported to the seventh session, an informal meeting with the national agencies in the Philippines was arranged at Manila during the course of the session. The meeting, which was attended by more than 30 representatives of eight national agencies, revealed that impressive progress had been made in the five months since the visit of the Joint Mission. Noteworthy steps included special arrangements with the bureau of Telecommunications for absolute priority to be given to typhoon warnings, the designation by PAGASA of senior officers as weather specialists at the National Disaster Control Centre whenever there is a typhoon, and the drawing up by the Department of Education and Culture of a comprehensive programme of education in typhoon and flood dangers. There has thus been a very active response to the recommendations stemming from the visit of the Joint Mission.

70. The occasion of a visit by representatives of LRCS, WMO and ESCAP to Japan in mid-1975 was used to organize a similar informal one-day meeting in Seoul. The Committee will recall that the Republic of Korea was visited by the joint mission in March 1973. This meeting, held at the Central Meteorological Office (CMO), was attended by representatives of the Ministry of Construction, CMO and the Korean National Red Cross Society (KNRC). Discussions covered the latest information on community preparedness and disaster prevention matters in the Republic of Korea, including the installation of a communication link to KNRC and the preparation of new public information material in the Korean language. The introduction of command post exercises in 1975 to test the readiness of the disaster prevention system before the onset of the typhoon season was reported to the joint mission. The exercises involve not only a number of national agencies but also call the participation of the public.

71. In agreement with the Government of Japan, the joint mission set forth a number of proposals designed to assist other countries affected by tropical cyclones in taking more effective measures to combat them. Action has been taken to implement most of these proposals. Both the "Disaster Countermeasures Basic Law and Related Laws and Ordinances" and the "Sakae Town's Area Disaster Prevention Plan" have been translated into English and copies made available for distribution to members of the Typhoon Committee and other interested countries. The proposals for the preparation of guidance material and for a regional seminar on community preparedness and disaster prevention have been taken up and a description of the progress made is given in sections (b) and (c) below.

72. It is believed that the above information will demonstrate that a positive response has been made to the Committee's request that follow-up action on the joint missions be taken by arranging informal meetings whenever possible. LRCS, WMO and ESCAP intend to pursue this policy in the future so that progress made can be closely monitored.

(b) Guidelines on community preparedness and disaster prevention

73. The wealth of material available in Japan and other countries on the organization of effective disaster prevention systems led the joint mission to propose the compilation of a manual embodying this experience for the benefit of countries where the system is less advanced.

74. A plan of action was accordingly mapped out by LRCS, WMO, ESCAP and TCS, including the preparation of an outline of the contents of the manual. An Editorial Board composed of representatives of each of the four organizations was set up and held its first session at Bangkok from 3 to 12 February 1975. At that session a detailed synopsis of the contents was drawn up and responsibility assigned for the preparation of the different chapters or parts thereof. The manual, which is expected to be published jointly by LRCS, WMO and ESCAP, will be entitled Guidelines for Community Preparedness and Disaster Prevention: Measures to Reduce Loss of Life and Damage Caused by Tropical Cyclones and Associated Floods.

75. Preparation of the material to be included in the Guidelines is actively in hand. Drafting is being carried out by staff members of the organizations or by consultants selected by them. Informal discussions on the progress made were held at Manila in June 1975 and the next session of the Editorial Board is scheduled to be held at Bangkok from 18 to 21 November. All available material will be reviewed at that meeting. The Board is expected to hold a further meeting at Manila early in 1976 to review the remaining contributions. It is hoped that the Guidelines can be published by mid-1976.

(c) Regional seminar on community preparedness and disaster prevention

76. As reported above, one outcome of the visit of the Joint Mission to Japan in 1974 was a proposal for the organization of a regional seminar on community preparedness and disaster prevention. At the seventh session of the Typhoon Committee the representative of Japan sought more detailed information on the requirements for the seminar. A general description of

/the objectives

the objectives and scope of the seminar, together with a broad outline of the programme was accordingly prepared and submitted to the Government of Japan.

77. At the thirty-first Commission session, the representative of Japan announced that his Government would provide the sum of \$US 50,000 for the seminar to be held at Tokyo in 1976. Detailed planning of the seminar has been taken up by ESCAP, in close consultation with LRCS and WMO. Representatives of the three organizations met Japanese Government officials at Tokyo in June 1975 to work out the programme for the seminar and to make the decisions required for its further preparation.

78. The seminar will be held at Tokyo from 14 to 29 June 1976 and apart from the member countries of the Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones, other selected ESCAP members as well as some countries in the tropical cyclone areas of the southwest Indian Ocean will be invited to nominate participants. The programme will consist of lecture and discussion sessions covering the whole range of community preparedness/disaster prevention activities, the presentation of country papers by participants, a study tour and a final evaluation session. An information paper giving the procedure to be followed in applying for participation, travel arrangements, seminar programme, etc., is to be distributed with the formal invitations about six months before the opening of the seminar.

(d) Consultant services

79. The seventh session of the Committee concurred with the view expressed by the Second Joint Mission that there was a pressing need to strengthen the role of TCS in community preparedness and disaster prevention. The possibility of securing consultant services as part of the current UNDP project was considered in this connexion. An approach was made to UNDP early in 1975, on follow-up assistance after the completion of the present UNDP project in 1976, which included periodic provision of consultants in community preparedness and disaster prevention.

2. Action on decisions adopted at the seventh session

80. The action taken on the decisions contained in paragraphs 94, 96, 97 and 98 of the report of the seventh session has already been described.

/3. Further

3. Further action proposed

81. It is suggested that the Committee may wish to:

- (a) Reconsider, in the light of changed circumstances, the programme for extending the Joint Mission's visit to member countries not previously visited;
- (b) Note the successful informal meetings held at Bangkok, Manila and Seoul as a follow-up to the visits of the Joint Mission;
- (c) Encourage the continuation of such informal meetings, and request LRCS, WMO and ESCAP to make the necessary arrangements with member countries whenever a suitable opportunity occurs;
- (d) Express its thanks to Japan for translating, printing and making available copies of the Disaster Countermeasures Basic Law and the Disaster Prevention Plan for Sakae Macchi;
- (e) Endorse the action taken by LRCS, WMO and ESCAP for the preparation of the Guidelines for Community Preparedness and Disaster Prevention and request them to ensure that publication is completed as soon as possible;
- (f) Thank the Government of Japan for its offer to fund and play host to the regional seminar on community preparedness and disaster prevention, and request ESCAP, in consultation with LRCS and WMO, to spare no effort to ensure the full success of the seminar;
- (g) Call upon its member countries to ensure their active participation in the seminar by sending at least one participant; and
- (h) Consider what further steps are needed to obtain consultant services for TCS in community preparedness and disaster prevention.

D. TRAINING AND RESEARCH

1. Training of personnel

82. In accordance with the information given at the seventh session, the Government of Japan decided to organize at Tokyo in 1975, a group training course in river engineering and another in meteorology. The course in river engineering is to last three months commencing 28 August 1975, and the one in meteorology (typhoon forecasting) four months commencing 25 September 1975.

Invitations for the nomination of trainees have been sent to the developing countries in the region including those in the Typhoon Committee. TCS sent a circular to the meteorological and hydrological services to ensure timely nominations for these training courses. The Chief Technical Adviser of TCS will deliver two lectures on typhoon forecasting during the training course in meteorology.

83. Early in 1975 TCS sent a circular letter to the member countries regarding offers of assistance made by some developed countries for the provision of training facilities. Special attention was drawn to the statement made by the representative of the United States at the sixth session of the Typhoon Committee, which was renewed at the seventh session, offering technical assistance by provision of long-term fellowships in the fields of meteorology and hydrological forecasting under the VAP of WMO.

84. It was understood that Thailand received five fellowships for 1975 from Australia as follows: two in hydrometeorology, one in radar meteorology and one in synoptic meteorology for 12 months each, and one in satellite meteorology for six months. Laos received three fellowships from France for training in instrumentation and maintenance of equipment. The Philippines submitted a proposal for a fellowship for a Ph.D. programme in the United States on tropical dynamic meteorology.

85. The Committee may wish to note that in accordance with the recent decision of the seventh WMO Congress (April-May 1975), VAP assistance will be applicable to granting of short-term fellowships for personnel engaged in WWW activities, in addition to the long-term fellowships as hitherto.

86. A WMO/UNDP Workshop on the Uses of Meteorological Radar was held at Kuala Lumpur from 23 June to 4 July 1975 for the benefit of the countries in Regions II (Asia) and V (South-West Pacific). Mr. V.D. Rockney (United States) was the Technical Director and Mr. S. Marshall (Canada), Mr. H.K. Brann (Australia) and Mr. N. Kodaira (Japan) acted as consultants for the Workshop. Mr. S.N. Sen, Chief Technical Adviser of TCS, delivered the opening lecture at the Workshop in participated in the discussions during the first week. Among the member countries of the Typhoon Committee, Hong Kong, Laos, the Philippines and Thailand sent participants.

87. The telecommunication and electronics expert of TCS gave on-the-job training in calibration and maintenance of weather radar at Seoul and in calibration and precipitation measurement by radar at Cebu, Philippines.

2. Co-ordination of research activities

88. WMO initiated action to carry out studies and development work forming part of the Plan of Action for the WMO Tropical Cyclone Project. The Seventh Congress of WMO (April-May 1975) was pleased with the progress made and decided that the Project should be continued. Copies of a "Status report on the implementation of the WMO Tropical Cyclone Project" prepared by the WMO secretariat have recently been circulated to member countries of the Typhoon Committee and to other countries concerned with tropical cyclones. The status report includes a table summarizing the proposed mode of implementation of the various sub-projects and their present status. Some members of the Typhoon Committee and TCS are associated with these subprojects.

89. The Royal Observatory, Hong Kong, stated in May 1975 that it was ready to produce objective forecasts of tropical cyclone tracks by various selected techniques and to disseminate them for operational use. A note on the Royal Observatory Tropical Cyclone Prediction Programme (1974-1975), describing the criteria for the issue of these forecasts and the code and formats proposed to be used for the messages, was circulated to the other members of the Committee for comments. The concurrence of Japan and Thailand for dissemination of these forecasts through their respective RTHs was being awaited.

90. The UNDP/WMO project on meteorological research and training in the Republic of Korea, which became operational early in 1974, continued its research and training activities. Hydrometeorological studies in the Nakdong River basin have been taken up in addition to other research studies under the project. A new building for the Institute was completed early in 1975 and formally opened on WMO Day.

91. In the Philippines, further progress has been made under the research project entitled "Development of design criteria and methodology for low rise/low cost buildings to better resist extreme winds". It is a multinational project participated in by the United States, Jamaica, Bangladesh and the Philippines, with its focal point in the Philippines. Data on extreme winds and building pressures are being gathered from three stations in the Philippines

/(Laoag,

(Laoag, Daet and Quezon City) for analysis. Draft reports and a documentary film were presented at a regional meeting held at Manila in May 1975 for the primary purpose of exchanging information.

92. The research activities under the typhoon moderation programme of the Government of the Philippines, which began in April 1974, have been pursued during the year. The building for the air operations unit has been completed while the central headquarters building is now under construction. A weather modification experiment designed for evaluation purposes was carried out for two and half months during April-June 1975 in the central Philippines. This experiment has several research subareas, including cloud modelling, radar rainfall correlation, analysis of wind structure, etc.

93. At its thirty-first session, ESCAP noted with interest the programmes and plans of the United States and the USSR for observations and research related to the work of the Typhoon Committee. This refers to the announcements made at the seventh session by the United States regarding its plans to transfer Stormfury project to the Pacific for the typhoon seasons of 1977 and 1978, and by the USSR to operate four research vessels in the western Pacific in 1975 for studying in particular the formation and movement of typhoons.

94. A WMO Technical Conference on Typhoon modification was held at Manila from 15 to 18 October 1974 in conjunction with the seventh session of the Typhoon Committee. Representatives from five member countries (Hong Kong, Japan, Philippines, Republic of Korea and Thailand) participated in this session. The present status of hurricane-seeding experiments was discussed at the Conference, and in conclusion a statement on typhoon moderation and experiments was adopted. The following extract from this statement is of interest to the Committee:

"It is recommended that WMO make every effort to support the experiments proposed by the Philippines and the United States of America, which are not only aimed at learning more about typhoon properties, but also at ways and means of significantly reducing wind damage with the help of seeding.

WMO is further asked to arrange, on a regional basis, the acceptance of a '24-hour limit' for typhoon interference; that is, typhoons should be seeded on an experimental basis only if they are not expected to reach land within 24 hours. (This requirement can be waived by WMO members concerned.)"

3. Action on decisions adopted at the seventh session

- (a) Offers of assistance by Japan, the Federal Republic of Germany, France and the United States (paragraphs 51-53)

95. Follow-up action has already been described.

- (b) Seminar on conceptual models for operational hydrological forecasting (paragraph 47)

96. As requested by the seventh session, the Secretary-General of WMO has submitted to UNDP a proposal for inclusion in the intercountry programme of a seminar on hydrological forecasting methods including the use of conceptual models in 1975 for countries in Asia and the Pacific.

- (c) Seminar on the use of meteorological satellite data for countries in Asia (paragraph 55)

97. The seventh session requested WMO to investigate the possibility of organizing such a seminar in 1976 or 1977, in co-operation with the United Nations and ESCAP. The WMO/ESCAP Panel on Tropical Cyclones expressed similar views at its second session. A proposal to include this seminar in the intercountry programme has been sent by WMO to UNDP.

- (d) Joint collaboration in typhoon research (paragraphs 64-66)

98. It may be recalled that, in connexion with the joint collaboration in typhoon research activities, the seventh session nominated Mr. Miyazaki (Japan) as co-ordinator for studies in storm surges and Mr. P.C. Chin (Hong Kong) as co-ordinator for studies in objective techniques of typhoon forecasting. The activities under these two subprojects are summarized below.

99. Mr. Miyazaki (Japan), who is also the leader of the panel for storm surge studies under the WMO Tropical Cyclone Project, visited Hong Kong and the Philippines in March 1975 and discussed storm surge problems with the research correspondents, other specialists and TCS. Mr. Miyazaki circulated copies of his papers on storm surges, together with a list and a map of the tide-gauge network in Japan. Mr. Arafles (Philippines) circulated a preliminary report of the ongoing project "Storm surges and storm surge potentials in the Philippines". The report includes an historical account of the occurrence of storm surges in the Philippines for the period 1907-1931. A plan has been prepared for setting up additional tide-gauge stations in the Philippines.

100. Considerable progress was achieved in updating the basic statistics of surge data for Hong Kong. Regression equations relating storm surge heights and various parameters representing storm characteristics have been developed. Attempts were also made to devise a numerical model to study the tidal and storm surge phenomena in Hong Kong.

101. Mr. P.C. Chin (Hong Kong) sent a questionnaire to the correspondents in other member countries and collected information on the objective and subjective techniques in use for operational typhoon forecasting, and on related studies completed or under way. During his visit to Hong Kong in July 1975, the Chief Technical Adviser of TCS discussed the subject with Mr. Chin and follow-up action to facilitate joint collaboration was considered. Mr. Chin proposed to initiate further action in the light of this discussion.

4. Further action proposed

102. The Typhoon Committee may wish to:

- (a) Record its appreciation of the valuable assistance provided by the Government of Japan in organizing, during 1975, training courses for the benefit of member countries;
- (b) Advise members to avail themselves of offers of training facilities made by the developed countries and those obtainable under VAP, including short-term fellowships;
- (c) Note and comment on the progress made under the typhoon moderation programme of the Philippines, and the programmes and plans of the United States to transfer Stormfury project to the Pacific in 1977-1978;
- (d) Welcome the action initiated by WMO for organizing a seminar on hydrological forecasting methods in 1975 and a seminar on the uses of meteorological satellite data in 1976 or 1977; and
- (e) Consider the action initiated for joint collaboration in typhoon research and recommend measures to foster such collaboration.

ANNEXES

Annex I

WWW GLOBAL OBSERVING SYSTEM - UPPER-AIR STATIONS

Deficiencies and further plans

Country and station	Radiowind (W)				Radiosonde (R)		Plans and remarks
	00	06	12	18	00	12	
<u>Cambodia</u>							
48991 Phnom Penh (Pochentong) ^{a/}	0	0	0	0	b/	b/	VAP project 08/1/1/1 circulated in 1971, no offer to date.
<u>Japan</u>							
47971 Chichijima		0		0			
991 Minamitorishima		0		0			
<u>Laos</u>							
48940 Vientiane		0		0			
<u>Philippines</u>							
98223 Laoag ^{a/}		0	0	0		0	
444 Legaspi		0	0	0			
618 Puerto Princesa	0	0	0	0			
645 Cebu ^{a/}		0	0	0		0	
753 Davao	0	0	0	0			
836 Zamboanga	0	0	0	0	0	0	RS/RW 00 GMT expected by end 1975.
<u>Republic of Korea</u>							
47138 Pohang		0		0			
187 Mosulpo AB		0		0			
<u>Thailand</u>							
48327 Chiangmai		0		0			
407 Ubon Ratchathani		0		0			
455 Bangkok				0			
568 Songkhla		0		0			

^{a/} Typhoon Committee priority station.
^{b/} VAP request.

/Annex II

Annex II

WWW GLOBAL OBSERVING SYSTEM - OTHER FACILITIES NOT YET IMPLEMENTED

(a) Storm-warning radar stations

Philippines	Basco	Implementation planned for 1975
	Tagaytay (60 km south of Manila)	Implementation planned for 1976
	Aparri	Implementation planned for 1976
Republic of Korea	Cheju	National project (time of implementation uncertain)
Thailand	Bangkok	Implementation planned for early 1976 from national resources

(b) Automatic picture transmission (APT) stations

Cambodia	Phnom Penh	VAP project - equipment delivered in January 1975
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Annex III

WWW GLOBAL TELECOMMUNICATION SYSTEM (GTS)

(a) National collection facilities

Steps have been taken to improve the national collection facilities of Laos and the Philippines, but short-comings still subsist, particularly in night-time collection facilities. See section II, A, 3.

(b) Regional telecommunication links not yet implemented

<u>Country</u>	<u>Link</u>	<u>Remarks</u>
Thailand/Cambodia	Bangkok-Phnom Penh	National/UNDP project
Thailand/Republic of South Viet-Nam	Bangkok-Saigon	National project

/Annex IV

Annex IV

PRIORITIES ESTABLISHED BY THE TYPHOON COMMITTEE AT ITS SEVENTH SESSION

Summary of the state of implementation and further plansObserving facilities(i) Upper-air stations

No plans 48991 Phnom Penh (Cambodia) - W observation implemented at 00 and 12 GMT. RS observation under VAP request but no offer.

Already planned: 98223 Laoag (Philippines) - 12 GMT radiosonde/radiowind
98645 Cebu (Philippines) National project 1976

(ii) Weather radar

Already planned: Vientiane (Laos) - Under VAP request; assistance offered by USSR

Basco (Philippines) - National project 1975

Cheju (Republic of Korea) - National project

Bangkok (Thailand) - National project 1976

(iii) APT stations

Already planned: Phnom Penh (Cambodia) - VAP project 1974 - equipment delivered in January 1975

(iv) Ocean weather stations

Already planned: ship at 16°N, 135°E - USSR provided ship till 1973. USSR planned to operate four research vessels in west Pacific in 1975.

Communication facilities(i) Improvement of national collection facilities

Already planned: Cambodia - National/UNDP project
Laos - Bilateral/UNDP project
Philippines - National/bilateral project (partly implemented)

(ii) Regional telecommunication links

Establishment of the following point-to-point links:

Already planned: Bangkok-Phnom Penh - National project (Bangkok)/UNDP project (Phnom Penh)

Bangkok-Saigon - National project (Saigon not yet ready)

Tokyo-Peking - National project 1975

Hong Kong - Peking - National project 1975

(iii) Other telecommunication facilities

Already planned: strengthening of RTH - Partially implemented with VAP/
bilateral help and national

FOR PARTICIPANTS ONLY

WRD/TC.3/5

12 September 1975

ORIGINAL : ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee

Eighth session

11-17 November 1975

Bangkok

PROGRAMME FOR 1976

(Item 7 of the provisional agenda)

Note by the Typhoon Committee secretariat

1. The action programme approved by the Typhoon Committee at its first session continues to provide the general guidelines for its future activities. The functions of the Committee given under article 6 of its statutes, and the functions and duties of the Typhoon Committee secretariat (TCS), as revised by the sixth session, are also relevant in this connexion.

2. The UNDP project "Technical Support to the Regional Typhoon Programme" has been approved for the three years 1974-1976. Under agenda item 5, the Committee will review the progress made during the first two years in the implementation of the various components of the UNDP project. The programme for 1976 should therefore include the unaccomplished part of the work plan for the project.

3. It is recognized that many activities of interest to the Typhoon Committee will be carried out by member countries. However, under this item the Committee may wish to consider only those items of work on which it will concentrate during 1976, with the assistance of TCS. For this purpose, the current developments in the execution of the Committee's programmes and the work plan and progress made under the UNDP project should be taken into account.

4. On the basis of the above considerations, the following tentative programme of work is drawn up for special attention during 1976 under the different components of the Committee's activities:

(a) Meteorological component

(i) Procurement, installation and operation of equipment provided by UNDP under the project and also other equipment obtained through national resources or with bilateral/VAP assistance. This includes radar picture transmission equipment to be received by the Philippines under the UNDP project, telecommunication equipment to be received by Laos under the UNDP project and through bilateral assistance from Japan, and 10-cm radar expected at Bangkok through national resources.

(ii) Provision or improvement of meteorological and telecommunication facilities included in the priority list established by the Committee. This includes provision of 10-cm radar for Vientiane (Laos) and strengthening of Bangkok RTH through VAP assistance.

(iii) Review of existing telecommunication facilities and data exchanges needed for typhoon warning services with a view to initiating remedial measures where necessary.

(b) Hydrological component

(iv) Establishment of pilot flood forecasting systems in Laos and Thailand. These activities will be based on the survey reports prepared by the team of Japanese experts with TCS participation. Both Laos and Thailand might request further assistance from Japan.

(v) Further improvement in the operation of the flood forecasting system in the Pampanga River basin (Philippines) based on experience gained since 1973 and on the recommendations of the Japanese review mission in 1975.

(vi) Development of flood forecasting in the Agno River basin based on a preliminary study made in 1975. Procurement of necessary equipment and construction of station houses and other structures will be initiated depending on financial provisions, including assistance from external sources if available.

/(c) Community

(c) Community preparedness and disaster prevention

(vii) Follow-up action on the joint LRCS/WMO/ESCAP missions in 1973 and 1974, including review by informal meetings whenever possible; assistance in the follow-up action by TCS consultant, if available.

(viii) Preparation of the Guidelines on Community Preparedness and Disaster Prevention: Measures to Reduce Loss of Life and Damage Caused by Tropical Cyclones and Associated Floods".

(ix) Organization of the Regional Seminar on Community Preparedness and Disaster Prevention at Tokyo.

(d) Training and research

(x) Completion of training with international fellowships under the UNDP project.

(xi) Training of additional personnel through group training courses in Japan and other fellowships through bilateral or VAP assistance. Short-term training courses on maintenance of electronic equipment may be given special consideration.

(xii) On-the-job training by TCS expert in the operation of telecommunication equipment, in calibration and maintenance of weather radar and in measurement of rainfall by radar.

(xiii) Stimulation of research activities through advisory services, exchange of information and joint collaboration among member countries. Special attention may be given to the studies of objective typhoon forecasting and of storm surges. Implementation of the WMO Tropical Cyclone Project is likely to provide additional impetus to typhoon research activities, particularly under sub-projects in which member countries of the Typhoon Committee and TCS are associated. Close contacts with the WMO/CAS Working Group on Tropical Meteorology are encouraged.

Action proposed:

5. The Committee may wish:

- (a) To approve in principle or suggest amendments to the items of work outlined above on which the Committee should concentrate during 1976;
- (b) To urge member countries to take all possible measures, with the assistance of TCS, to accelerate implementation of the Committee's programmes.

WRD/TC.3/6
12 September 1975

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AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee

Eighth session
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UNDP TECHNICAL SUPPORT TO THE REGIONAL TYPHOON PROGRAMME

(Item 5 of the provisional agenda)

Note by the Typhoon Committee secretariat

Introduction

1. The UNDP project entitled "Technical Support to the Regional Typhoon Programme" was approved in 1973 for a period of three years (1974-1976). Implementation of the project thus commenced in January 1974. The project provides for continuation of UNDP assistance to the typhoon programme up to the end of 1976 at a total cost of \$US 720,900. The UNDP contribution includes the services of three international experts at the Typhoon Committee secretariat (TCS), five fellowships for one year each, and equipment at a cost of \$US 350,000. The project also envisages bilateral assistance including a matching equipment component. The estimated government contributions to the project amount to the equivalent of \$US 435,760. In addition to meeting local costs for the implementation of the programmes and provision of facilities and supporting personnel to TCS, the participating Governments are also expected to provide counterpart professional staff who would eventually replace the international experts at TCS. The Government of the Philippines has indicated its readiness to continue providing host facilities to TCS.

/2. The seventh

2. The seventh session of the Committee noted with satisfaction that good progress had been made in 1974 in the implementation of the project. The expert component had been fully implemented; most of the equipment to be provided under the project was under procurement and action was initiated for implementation of the fellowships. It was also expected that the Government of Japan would provide bilateral assistance to Laos and Thailand in establishing pilot flood forecasting systems. As to the contribution of the participation Governments to the project, the seventh session was informed that all obligations stipulated during 1974 in the project document had been satisfactorily met except the assignment of counterpart professional staff to TCS. The Committee noted with appreciation the offers made by the Philippines to assign a synoptic meteorologist to TCS in 1975 and by Japan to consider assigning a hydrologist some time in 1976.

Progress in the implementation of the project

3. The activities of the Typhoon Committee during 1975 are reviewed in detail under agenda item 4 (WRD/TC.3/4). The Committee may wish to consider under this item the present status of implementation of the UNDP project. For this purpose, the progress so far made in the implementation of its main components is summarized below:

(a) Equipment component

4. At the time of preparing this document, telecommunication equipment and ancillary equipment for weather radar worth \$US 275,000 had already been ordered by WMO, after consultations with TCS and the concerned member countries. Equipment worth \$US 90,000 had already been delivered to Laos, the Philippines and the Republic of Korea. The remaining equipment ordered by WMO is expected to be delivered before the end of 1975.

5. Procurement action for the balance of the equipment - worth \$US 75,000 (out of the total provision of \$US 350,000) - has been under consideration. This includes spare parts worth \$US 30,000. The lists of spare parts needed for emergency repairs of existing equipment were prepared by TCS in consultation with the concerned member countries and forwarded to WMO. The equipment is under procurement.

/6. The radar

6. The radar test equipment and teleprinter spare parts received by the Republic of Korea are already being fully utilized. The telecommunication and electronics expert of TCS assisted the technicians in Seoul in calibrating their 10-cm radar and adjusting it to optimum operational condition. Nine teleprinters were also repaired. The equipment received by the Philippines has been checked by the telecommunication and electronics expert. His official mission to Vientiane (Laos), which was planned mainly to give on-the-job training in the use of the telecommunication equipment already delivered, had to be postponed because of the local condition.

7. It is expected that most of the remaining equipment will be delivered to the concerned members by the end of 1975. The project activities under the equipment component will thus enter a busy period in 1976, by which time the entire equipment will be installed or in use and on-the-job training will have to be organized where necessary.

(b) United Nations experts and counterpart staff

8. The assignments of the three United Nations experts already serving in TCS were extended with effect from 1 January 1974. These experts were thus made available from the beginning of the project period and without interruption as scheduled.

9. The supporting staff for TCS (secretaries and drivers) continued to be provided by the Government of the Philippines. Counterpart staff needed for operation of the pilot flood forecasting systems in the Republic of Korea and in Thailand were provided. Staff required for flood forecasting in Laos and for operation of equipment for radar picture transmission in the Philippines are expected to be provided as soon as the facilities have been installed.

10. As regards provision of counterpart professional staff to TCS, the authorities in the Philippines have given an assurance that a synoptic meteorologist will be assigned to TCS in the second half of 1975. Japan has offered to consider assigning of a hydrologist some time in 1976. More definite information in this regard may be expected at the session.

/(c) Fellowships

(c) Fellowships

11. Five international fellowships of one year each were provided by UNDP as part of the project. It was planned that each of the five member countries, Cambodia, Laos, the Philippines, the Republic of Korea and Thailand, would receive one-year fellowships. In view of the group training courses in hydrology and flood forecasting organized by the Government of Japan annually since 1969 for the benefit of the Typhoon Committee countries, the Committee has agreed that the UNDP fellowships might be devoted to training in meteorology or in meteorological telecommunication/electronics.

12. As reported at the seventh session, TCS discussed with the concerned member countries their requirements and proposals for the fellowships. Some countries expressed their desire to nominate two or three trainees for shorter courses instead of one fellowship of one year. Travel expenses and language requirements were taken into account in the choice of countries where training courses could be arranged. The following proposals were finally accepted by WMO.

<u>Member receiving fellowship</u>	<u>Subject of training</u>	<u>Duration</u>	<u>Country of study</u>
Cambodia	1. Maintenance of electronic equipment	6 months	Thailand
	2. Refresher course in tropical meteorology including familiarization visits	6 months	United States
Laos	1. Maintenance of teletype and Fax equipment	4 months	Thailand
	2. Maintenance of transmitters and receivers	4 months	Thailand
	3. Maintenance of RS/RM equipment	4 months	Thailand
Philippines	1. Numerical weather prediction	1 year	United States
Republic of Korea	1. Storm surge (observations, forecasting and related research)	1 year	Japan
Thailand	1. Maintenance of weather radar	6 months	United States or Japan
	2. Maintenance of electronic equipment (APT, telemetering rain-gauge, ceilometer, etc.)	6 months	Japan

13. Nominations were submitted to WHO by Cambodia, Laos, the Philippines and the Republic of Korea. Nominations from Thailand were delayed, however, pending the selected candidates passing the required English test. The three candidates nominated by Laos commenced their training in Bangkok in June 1975. Training of the Korean candidate commenced in Tokyo in July 1975 and that of the Philippine candidate was scheduled to commence in the United States in August 1975. Further information regarding the training of the candidates from Cambodia and Thailand may be available at the session.

(d) Bilateral assistance

14. One of the most significant items of bilateral assistance to the project activities has been the loan of \$US 1.5 million given by the Government of Japan for the purchase of flood forecasting equipment in the Republic of Korea. Other bilateral or VAP assistance during 1974-1975 included provision of telecommunication equipment by the USSR to Laos, of facsimile equipment by Australia to Thailand, group training courses organized by Japan and other training facilities provided by Australia, France and the United States.

15. In approving the project with an equipment component of \$ 350,000, UNDP stipulated that at least a like amount of equipment should be obtained from bilateral sources. Negotiations were accordingly carried out as to the possibility of obtaining such assistance from the Government of Japan. In response to requests for bilateral assistance for implementation of pilot flood forecasting systems in Laos and Thailand, the Government of Japan sent a survey team to the two countries in early 1975. It is expected that, after receipt of the survey reports by the two countries, the Government of Japan will be approached by them for further assistance for implementation of the pilot flood forecasting systems. Further information in this regard may be available at the session.

UNDP support beyond 1976

16. The seventh session of the Committee gave some consideration to the needs for further assistance from UNDP after the termination of the present project, that is, beyond 1976. It was considered that, even after the assignment by member countries of the counterpart professional staff to TCS, it

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would be necessary for some years to have a senior technical adviser internationally recruited to guide and advise this professional staff. The Committee also considered that occasional consultant services would be necessary. In pursuance of the Committee's recommendations, W40 sent the following proposals to UNDP in January 1975 for inclusion in the inter-country projects for the period 1977-1981:

- (i) Continuation of a senior technical adviser to TCS for at least three years (1977-1979) to guide and advise the professional staff provided by the participating countries;
- (ii) Occasional consultant services, mainly in the field of community preparedness and disaster prevention and perhaps in typhoon, flood and storm surge forecasting;
- (iii) Training seminar on the uses of meteorological satellite data for typhoon warning, which may be organized in 1976 or 1977.

17. The staffing of TCS beyond 1976 will be discussed under agenda item 6 on the basis of a separate document (WRD/TC.8/7). It is expected that under this item the Committee will draw up a detailed plan that would ensure uninterrupted staffing of TCS for a reasonable period beyond 1976.

Action proposed

18. The Committee is invited:

- (a) To note the progress made in the implementation of the various components of the UNDP project "Technical Support to the Regional Typhoon Programme";
- (b) To recommend measures that would ensure completion of the remaining programmes planned during the project period; and
- (c) To consider needs for UNDP assistance beyond 1976, the action initiated in this connexion and further steps that may have to be taken.

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WRD/TC.8/7
25 September 1975

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
BangkokSTAFFING OF THE TYPHOON COMMITTEE SECRETARIAT
BEYOND 1976

(Item 6 of the provisional agenda)

Note by the ESCAP and WMO secretariatsIntroduction

1. The arrangements whereby the services of technical experts in the Typhoon Committee secretariat (TCS) have been provided by UNDP as technical support to the regional typhoon programme for a number of years are familiar to the Committee. The Committee is also aware that the current UNDP project (1974-1976) calls for the gradual replacement of the experts in TCS by counterpart staff provided by the member countries. At its seventh session, the Committee was informed of the plans of two members, Japan and the Philippines, to provide counterpart staff before the end of the project in December 1976. On the other hand, the Committee also recorded its view that, even after the assignment of professional staff for TCS by members, it would be necessary to have an internationally recruited senior technical adviser for some years to guide and advise the professional staff. A further need for periodic consultant services in community preparedness and disaster prevention was also mentioned by the Committee. ESCAP and WMO were requested by the Committee to keep these requirements in mind when discussing with UNDP future support for the typhoon programme. In November 1974, WMO wrote to UNDP proposing that there would be a need for one senior technical adviser for at least three years, plus consultant services in specialized fields such as community preparedness, typhoon and storm surge forecasting at the rate of four man/months per year.

2. The eighth session of the Committee, which takes place approximately one year before the end of the present UNDP project, is the last session at which decisions can be made with any prospect of their implementation by the beginning of 1977. The Committee will, therefore, need to reach firm conclusions regarding the extent to which the member countries can assume responsibility for the provision of staff for TCS, both in terms of the recruitment of personnel and the funding of salaries and allowances, travel and administrative costs, as well as the extent and type of UNDP or other outside support to be requested. It is essential to the continued, orderly conduct of the Committee's programme through its secretariat that detailed plans should be made at this session.

3. These questions have been discussed between WHO and ESCAP, which consider that, at the eighth session of the Committee, decisions should be taken which would provide a basis for planning for the five-year period 1977-1981 and firm arrangements for, say, the two years 1977 and 1978. This document is designed to help the Committee to determine requirements after the end of 1976, taking into account the various possibilities that might exist.

Present staff of the Typhoon Committee secretariat

4. The present staffing of TCS consists of:
- a chief technical adviser (a synoptic meteorologist);
 - a hydrologist/flood forecasting expert;
 - a telecommunication/electronics expert.

All are full-time staff under the UNDP project.

Staff needs beyond 1976

5. The requirements appear to be:
- (a) A senior technical adviser (STA) as explained in paragraph 1 above. The STA should be an experienced synoptic meteorologist but should also have the capacity, and be given the scope, to exercise general direction and supervision over other areas in which TCS has responsibilities.

(b) Staff for:

- (i) Synoptic meteorology;
- (ii) Hydrology/flood forecasting;
- (iii) Telecommunications/electronics;
- (iv) Related aspects of community preparedness/disaster prevention.

Availability of counterpart staff

6. Counterpart staff from member countries expected to take up their duties during 1976 consist of:

- a synoptic meteorologist provided by the Philippines;
- a hydrologist/flood forecaster provided by Japan.

Both would be full-time staff.

Discussion of main possibilities

7. In considering the arrangements that might best serve the Committee's purposes during the five years 1977-1981, it is necessary to take into account that (a) in work of such importance, the encouraging rate of progress already made by the Committee and its secretariat should at least be maintained and, if possible, accelerated; (b) in due course, the total effort, including costs, should be borne by the member countries.

8. Taking into account the views expressed by the Committee at its seventh session, it seems probable that a high proportion of the responsibilities and work of the TCS could be covered by the following:

- (a) Senior technical adviser, as described in paragraph 5 (a) above, internationally appointed and funded;
- (b) Two counterpart staff, as described in paragraph 6 above.

However, there would be significant gaps remaining to be filled.

9. Referring to paragraph 5 above, the principal gap would be in the field of telecommunications/electronics. This gap and any others might be filled by short-term consultancy assignments, arranged internationally or, if practicable, by member countries. In this connexion, member countries are requested to give serious consideration to the extent to which they might be able to provide the services of such short-term consultants. It will be necessary for

/the Committee

the Committee to assess total consultancy requirements and to suggest arrangements by which they might be met.

Costs

10. Having determined the staff requirements for the TCS, including full-time personnel and short-term consultants, the Committee might assess the funds needed for work to be carried out effectively. This assessment should include not only salaries and allowances but also travel and operational costs associated with the secretariat (internationally recruited and counterpart) and equipment costs.

Action proposed

11. It is proposed that the Committee, at its eighth session, should set forth a plan for the operation of the TCS in the five-year period beyond 1976. The plan should express clearly:

- (a) The needs in terms of full-time staff and consultants;
- (b) The needs in terms of funds for travel and other expenses;
- (c) Arrangements proposed for the provision of staff and for deciding their terms and conditions of services;
- (d) Estimated costs and proposed sources of funds.

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

CO-ORDINATION WITH THE WMO TROPICAL CYCLONE PROJECT
AND REGIONAL PROGRAMMES

(Item 8 of the provisional agenda)

Note by the WMO secretariat

Introduction

1. The WMO Tropical Cyclone Project was approved by Sixth Congress (Geneva, 1971) and since that time the efforts of Governments and of international organizations have resulted in a significant reduction in the human suffering and devastation which are caused by tropical cyclones. Seventh Congress (Geneva, 1975) was pleased with the progress that had been made in carrying out the aims of the Project and considered that still further improvements in the detection and prediction of tropical cyclones and on flood forecasting would be achieved by the progressive implementation of World Weather Watch and of the WMO Operational Hydrology Programme (OHP).

2. Seventh Congress therefore decided that the WMO Tropical Cyclone Project should be continued during the seventh financial period. WMO's activities in this field already cover a wide range and it seems essential to maintain the progress that is being made on a broad front. The importance of all this work needs no emphasis because it is accepted that

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everything possible should be done to assist countries to develop efficient forecasting and warning systems which would fulfil a vital role in tropical cyclone situations. The decisions of the WMO Seventh Congress on the WMO Tropical Cyclone Project are reproduced in Appendix A to this document for the benefit of participants in the eighth session of the Typhoon Committee.

3. At its seventh session, the Typhoon Committee was informed of the different activities being undertaken as part of the WMO Tropical Cyclone Project by means of its "Plan of Action" or through its associated programmes. This document provides information on the global activities and on more recent developments in other tropical cyclone areas so that the eighth session may review the effectiveness of the present arrangements for the co-ordination of such activities and the exchange of information thereon.

WMO Tropical Cyclone Project - Global Aspects

4. Much of the action necessary to implement the many different aspects of the "Plan of Action" for the WMO Tropical Cyclone Project, which was approved by the Executive Committee and circulated to all members in 1973, was initiated by the Secretary-General in 1974 under guidance from the Executive Committee. This Plan of Action envisaged an initial implementation programme, which listed items for specific action together with suggestion for study and development. It also included probable implementation action following certain studies.

5. A detailed implementation programme has been drawn up on all the complex facets of this Plan of Action and certain general points can be summarized. For example, questions relating to instrument development have been referred to the Commission for Instruments and Methods of Observation (CI MO) or to members as appropriate, whilst matters relating to the forecasting of floods are under active consideration by the Commission for Hydrology (CHy). CHy has appointed a Rapporteur on Forecasting of Floods Resulting from Tropical Cyclone Rainfall and has requested its Working Group on Hydrological Forecasting to study the general problems related to the hydrological aspects of tropical cyclones.

6. Matters relating to research into tropical meteorology were considered by the Commission for Atmospheric Sciences (CAS), which asked its Working Group on Tropical Meteorology to pay particular attention to atmospheric processes directly related to the improvement of the forecasting of tropical cyclone behaviour. The Executive Committee has endorsed the recommendation that this

/work

work should be carried out within the CAS machinery. This group met in Geneva in February 1975 and made a review of research aspects of the WMO Tropical Cyclone Project. Proposals to intensify research in some important subject areas relevant to the implementation of TCP are contained in the report of this group, a copy of which has already been distributed to all members of regional bodies.

7. Experts from a number of countries who expressed willingness to undertake a substantial amount of work for the implementation of the Plan of Action were asked to conduct a number of specific studies in the form of subprojects. Appendix B to this document gives a list of subprojects and information about their present status. It will be seen, for example, that work has already started on subproject no. 7 on storm surge prediction and that work is about to begin on several other subprojects.

8. Furthermore, WMO is participating in the United Nations Disaster Relief Co-ordinator Office (UNDRO) project "A study of the state of the art in disaster prevention and mitigation", which also has support from the United Nations Environmental Programme (UNEP). WMO, in co-operation with UNEP, is also conducting a project on "Quantitative evaluation of disaster risks (tropical cyclones) - phase I" (under UNEP's Natural Disaster Programme Activity). Both of these projects will contribute to the implementation of the WMO Tropical Cyclone Project - Plan of Action. Under the latter of these projects, it is expected that data related to frequencies and intensities of tropical cyclones will become available together with such additional information as frequency/height distribution of storm surges and river floods and depth/duration/frequency graphs of rainfall. An implementation programme for the WMO Tropical Cyclone Project - Plan of Action - is reproduced in Appendix B to this document.

Other regional tropical cyclone programmes

Regional Association I (Africa) Tropical Cyclone Committee for the South-West Indian Ocean

9. The RA I Tropical Cyclone Committee for the South-west Indian Ocean held its second session in Saint-Denis (La Réunion) in October 1974. This was the first time the committee met following the sixth session of Regional Association I (Africa), when it was decided to re-establish the Tropical Cyclone Committee to pursue the valuable work it has initiated in this area. The committee reviewed the technical plan which has been elaborated at its first session and considered

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that the structure of the plan was a comprehensive statement of long-term aims which could be expected to be realized during the next 10 to 20 years. Accordingly, the various aspects of this plan were examined in the light of new information from members and an Action Programme for the next two years was drawn up. The progress made by members in the implementation of the facilities required in the plan was noted with satisfaction, in particular, the progress in the Madagascar UNDP project for the installation of three 10-cm radar surveillance stations at Tananarive, Morondava and Antalaha. The first station is expected to become operational at the beginning of 1975 and the other two during the cyclone season 1975/1976 as well as the plans of Mauritius for installing a 10-cm radar surveillance station on the island by 1976.

10. Another significant event in the activities of this Committee was the LRCS/WMO Joint Mission to Mauritius, La Réunion and Tanzania on community preparedness and disaster prevention, which visited the area in June/July 1974. The report of this joint mission was considered by the second session of the RA I Tropical Cyclone Committee for the South-West Indian Ocean and it decided to incorporate the recommendations of the mission into the Committee's Technical Plan and Action Programme.

11. The third session of the RA I Tropical Cyclone Committee is scheduled for the middle of 1976 and up-to-date information on its plans will be made available at the eighth session of the Typhoon Committee.

WMO/ESCAP Panel on Tropical Cyclones

12. The second session of the WMO/ESCAP Panel on Tropical Cyclones was held at Colombo, Sri Lanka, from 18 to 23 December 1974. The session was attended by representatives from Bangladesh, Burma, India, Pakistan, Sri Lanka and Thailand as well as by observers from the Federal Republic of Germany, UNDP, LRCS and the secretariat of the Typhoon Committee. Mr. G.S. Jayamaha (Sri Lanka) and Mr. P. Soontarotok (Thailand) were elected chairman and vice-chairman of the Panel respectively and they will hold these functions until the next session of the Panel, foreseen for the beginning of 1976. This Panel's activities cover the Bay of Bengal and the Arabian Sea tropical cyclone areas and has as its main function, like the other regional tropical cyclone bodies, the promotion and co-ordination of measures required to minimize tropical cyclone damage in its areas of responsibility. A great deal of the session was devoted to reviewing the co-ordinated technical plan to reduce tropical cyclone damage in the Bay of Bengal and the

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Arabian Sea, which was adopted at its first session in Bangkok late in 1973, as well as to devising an action programme to guide its most pressing activities in the next one or two years. It thus gave detailed attention to the meteorological facilities, including telecommunication, required as the basis of an effective tropical cyclone warning system. It was recognized that some important improvements achieved in 1974 in the implementation of the Panel's Technical Plan, in particular in the observing and telecommunication programmes by a number of members, augur well for the future.

13. In considering the hydrological component, the Panel decided to pursue the establishment of modern flood forecast and warning systems for a pilot river basin in each member country, rather than to attempt the development of a broad-scale plan for the area as a whole at this early stage. It therefore recommended that WMO, in collaboration with ESCAP, provide guidance and otherwise assist in the development of pilot basin plans within those countries interested in pursuing this approach.

14. A consultant provided by the League of Red Cross Societies carried out in March/May 1974 a study of the present state of community preparedness and disaster prevention in Bangladesh, Burma, India and Sri Lanka. The Panel was presented with its report and, while recognizing that the mission had mainly been of a fact-finding nature and that the report did not, therefore, contain specific recommendations, it could well be considered as a necessary prelude for further action.

15. Of special importance is the statement, made by the UNDP representative at the session, of the readiness of UNDP to consider providing support to the Panel's programmes, both during the current programming period and during the next period concerning the years 1977-1981, in the development of regional defences against tropical storms. Consequently, the session felt that a project should be drawn up as soon as possible, seeking UNDP support and considered that it should include a request not only for international expert services but also for training fellowships and for a limited amount of equipment of special importance to the early development of more effective cyclone warning services in the Bay of Bengal and the Arabian Sea tropical cyclone area. Further, shortly after this session, the Government of the Netherlands decided to finance, under its ESCAP trust fund, a technical adviser for two years to assist the activities of the Panel. ESCAP and WMO are now taking the necessary co-ordinated action for the early appointment of a suitable expert.

/Seminars,

Seminars, technical conferences and workshop

Technical Conference and Typhoon Modification

Technical Conference on Typhoon Modification

16. A WMO Technical Conference on Typhoon Modification was held at Manila, Philippines, from 15 to 18 October 1974. As a result of the high level of the scientific contributions presented, the excellent conduct of the work of the conference by its chairman and the chairman of the sessions as well as the excellent host facilities provided by the Government and the Permanent Representative of the Philippines with WMO, it was a highly successful conference. The outcome of the conference was the adoption of a statement on typhoon moderation in which it was recommended that WMO should encourage and support any undertaking which is aimed at increasing our knowledge concerning the nature and properties of tropical cyclones, with particular emphasis on improved forecasting, and in situ measurements and theoretical/numerical studies of the details of tropical cyclone dynamics and microphysics. WMO was also asked, in making efforts to support the experiments proposed by the Philippines and the United States, to arrange, on a regional basis, the acceptance of a "24-hour limit" for typhoon interference, i.e. that typhoons should only be seeded on an experimental basis when they are not expected to reach land within 24 hours. The proceedings of the conference have been published by WMO (Publication WMO-No. 408). Another WMO technical conference on this subject is recommended for 1978.

Workshop on uses of meteorological radar

17. With the financial support of the United Nations Development Programme, WMO organized as an interregional project for regions II (Asia) and V (Southwest Pacific), a Workshop on the Uses of Meteorological Radar. At the invitation of the Government of Malaysia, this workshop took place at Kuala Lumpur from 23 June to 4 July 1975 and was attended by 27 participants from 16 countries.

The primary purpose of the workshop was to provide meteorological personnel from developing countries with a basic knowledge of the fundamental techniques of radar meteorology. In addition, it gave participants an opportunity to exchange ideas on the operational and research aspects of the use of radar. Special emphasis was devoted to the applications of radar to the detection and tracking of tropical cyclones, and lectures were presented on the WMO Typhoon Project, the operation of warning networks, and the issuance of warnings to the public.

Two manuals and a textbook on radar meteorology were distributed to participants well in advance of the workshop, as well as a complete set of lecture notes. The participants also made interesting contributions and showed that a good deal of thought is being given to the best use of meteorological radar, especially in the detection and tracking of tropical cyclones.

Seminar on the use of meteorological satellite data for countries in Asia

18. The seventh session of the Typhoon Committee requested WMO to investigate the possibility of organizing such a seminar in 1976 or 1977, in co-operation with the United Nations and ESCAP. The WMO/ESCAP Panel on Tropical Cyclones expressed similar views on the subject at its second session. Without prejudice to the seminar being organized with other resources, a proposal to include this seminar in the inter-country programme has been sent to UNDP.

Seminar on conceptual models for operational hydrological forecasting

19. As requested by the seventh session of the Typhoon Committee, the Secretary-General of WMO has submitted to UNDP a proposal for inclusion in the inter-country programme of a Seminar on Hydrological Forecasting Methods, including the use of Conceptual Models in 1975 for countries in Asia and the Pacific.

Status reports on the implementation of the WMO Tropical Cyclone Project

20. As follow-up action on paragraph 54 of the report of the second session of the WMO/ESCAP Panel on Tropical Cyclones, and taking into account the views expressed by members of the Typhoon Committee at its seventh session (see paragraphs 99 to 103 of the report of the session), the WMO secretariat distributed on 15 July 1975 to all concerned a status report on the implementation of the WMO Tropical Cyclone Project. If so desired, this report could be the first in a series and any suggestions as to the contents or improvements would be welcomed.

Action proposed

21. The Committee is invited:

1. To note:

- (a) the above information concerning the developments in related WMO programmes;
- (b) the decision of the Seventh World Meteorological Congress relevant to the WMO Tropical Cyclone Project (see Appendix A);

2. To express a view and make suggestions concerning the issue by the WMO secretariat of periodic status reports on the implementation of the Tropical Cyclone Project (ref. WMO letter 18.442/W CY/AS of 15 July 1975);
3. To consider what further measures are required, if any, to ensure the necessary degree of collaboration with these programmes.

/APPENDIX A.

APPENDIX A.

Decisions of Seventh World Meteorological Congress

Geneva, 28 April - 23 May 1975

concerning the WMO Tropical Cyclone Project

3.2.4 Tropical Cyclone Project (Agenda item 3.2.4)

3.2.4.1 Congress noted with satisfaction the speedy action taken by the Executive Committee in the development of the Plan of Action for the WMO Tropical Cyclone Project in accordance with the directives given by Sixth Congress. It also noted the progress made in the implementation of the global aspects of the Plan of Action by CIMO, CAS, CHy and a number of Members.

3.2.4.2 Congress expressed great satisfaction at the considerable progress made in both the planning and the implementation of the regional part of the Plan of action of the project which is being done in close collaboration with such regional bodies as the WMO/ESCAP Typhoon Committee, the WMO/ESCAP Panel on Tropical Cyclones, the RA I Tropical Cyclone Committee for the South-West Indian Ocean and the WMO Regional Associations concerned.

3.2.4.3 Congress was particularly gratified with the generous assistance provided by members through the WMO Voluntary Assistance Programme (VAP) and bilateral aid programmes which have helped to accelerate the implementation of the WMO facilities in cyclone prone areas. This assistance has greatly contributed to attaining the coin objectives of this project, which are the mitigation of the harmful effects of tropical storms.

3.2.4.4 Congress also noted with appreciation the considerable support for the projects from the United Nations Development Programme (UNDP), in terms of assistance in the form of equipment and services to countries in areas affected by tropical storms, and the technical support given through the Typhoon Committee Secretariat.

3.2.4.5 In expressing its appreciation of the efficient and effective co-operation with the United Nations Disaster Relief Co-ordinator Office (UNDRO), the United Nations Environmental Programme (UNEP), the League of Red Cross Societies (LRCS) and the Economic and Social Commission for Asia and the Pacific (ESCAP) in projects aiming at the mitigation of tropical cyclone disasters, Congress felt that the WMO Executive Committee and the Secretary-General should strengthen the co-operation with other international organizations active in the field of

/disaster

disaster prevention and relief. It was suggested that more attention should be given to community preparedness problems, in particular public information and education in areas affected by tropical cyclones. Furthermore, Congress requested the Secretary-General to continue and intensify the assistance to countries, as necessary, in the implementation of relevant recommendations made by the relevant co-operating organizations.

3.2.4.6 Congress confirmed that the primary objectives of the WMO Tropical Cyclone Project were:

- (a) Strengthening the present capabilities of detection, tracking and forecasting of tropical cyclones;
- (b) Making more generally available the techniques of quantitative storm-surge forecasting;
- (c) Strengthening flood forecasting capabilities, particularly with respect to flooding associated with tropical cyclones;
- (d) Improving tropical cyclone warning systems;
- (e) Providing support to disaster prevention and community preparedness and related activities;
- (f) Providing basic data on risk of loss by winds, storm-surges and floods to those who need them for development planning or other purposes.

It was, however, recognized that the project embraces a large variety of elements which are different in nature, some requiring more attention from an operational point of view, others from a scientific point of view. Congress therefore agreed that to achieve the ultimate objective of the project, namely the issue of timely warnings and the prevention of disasters, it was necessary for both operational and research aspects to be given due attention.

3.2.4.7 Congress noted with interest a document submitted by France on the utilization of geostationary satellites for tropical cyclone detection and tracking. One of the recommendations in the document was to have a team of experts at the ground receiving station during the tropical cyclone season to interpret the satellite images and provide necessary advisories. In this connexion, Congress noted with appreciation a similar arrangement that is already in existence in the United States of America. The document submitted by France also suggested that procedures should be developed for the retransmission of the satellite images in the form of WEFAX broadcasts during the tropical cyclone season.

/It

It was agreed to note the above features and to request regional bodies concerned to initiate appropriate actions. In this regard, the plans of Members for launching geostationary satellites which will provide cloud pictures at more frequent intervals were reported. Congress expressed its gratitude to the satellite operating Members for the benefits already obtained in the utilization of satellite data by Meteorological Services and welcomed the plans for geostationary meteorological satellites.

3.2.4.8 It was recognized that the implementation of the tropical cyclone warning system is heavily dependent upon the efficient performance of World Weather Watch. The Commission for Basic Systems (CBS) and the Regional Associations should therefore continue to make substantial contributions, especially in the operational aspects of the project. It was suggested that Regional Associations and regional bodies concerned with tropical storms should consider under the WMO ways and means to increase the number of aircraft observations, including weather reconnaissance flights from the areas affected by tropical cyclones. The need was also pointed out for establishing in cyclone-prone areas an observing network with a higher horizontal resolution than that of the WMO basic network, particularly for storm-surge and flood warnings. The gratitude of countries affected by tropical cyclones was extended to all Members who have assisted or are planning to assist the Meteorological Services in those areas and/or providing additional facilities such as weather ships, reconnaissance flights, etc., which contribute substantially to the efficiency of cyclone forecasting and warnings.

3.2.4.9 The main decisions of Congress on the WMO Tropical Cyclone Project were incorporated in Resolution 13 (Cg-VII) and in Resolution 10 (Cg-VII).

/Resolution 13

Resolution 13 (Cg-VII)

WMO TROPICAL CYCLONE PROJECT

THE CONGRESS,

NOTING:

(1) Resolution 18 (Cg-VI) - WMO Tropical Cyclone Project,

(2) Resolution 3234 (XXIX) of the General Assembly of the United Nations - International co-operation in the peaceful uses of outer space,

(3) Resolution 2816 (XXVI) of the General Assembly of the United Nations - Assistance in case of natural disaster, and other disaster situations,

(4) Resolution 2914 (XXVII) of the General Assembly of the United Nations - International action for the mitigation of the harmful effects of storms,

SHARING FULLY the concern expressed therein at the devastating effects of tropical cyclones,

RECOGNIZING:

(1) That significant reduction in devastation and human suffering has already been accomplished by the efforts of the governments concerned and by the activities of international organizations,

(2) That considerable further improvements can still be made in the observation and prediction of tropical cyclones by the progressive implementation of the World Weather Watch, and in particular by the wider use of meteorological satellites,

NOTING WITH SATISFACTION:

(1) The action taken by the Executive Committee concerning the planning and implementation of the WMO Tropical Cyclone Project and the prompt adoption of its plan of action,

(2) The generous assistance through the WMO Voluntary Assistance Programme and bilateral agreements which have helped to accelerate the implementation of the WMO and the plan of action for the Tropical Cyclone Project,

(3) The successful activities of the joint WMO/ESCAP Typhoon Committee and the Panel on Tropical Cyclones and the RA I Tropical Cyclone Committee,

(4) The useful co-operation with UNDRO, UNEP and LRCS,

/CONSIDERING

CONSIDERING that the basic objectives of the Tropical Cyclone Project are the mitigation of the harmful effects of tropical storms and the minimization of their destructive potentials,

REAFFIRMS that the World Meteorological Organization, acting in concert with the governments concerned and with other international organizations active in the field of disaster prevention and relief, will increase further its efforts to reduce the deadly toll of tropical cyclones, and accompanying flooding and to this end,

DECIDES that the WMO Tropical Cyclone Project will be continued during the seventh financial period;

REQUESTS the Executive Committee to review and update the plan of action as required in the light of new requirements and technological advances, in particular on the use of meteorological satellites and the results of studies conducted under the project such as storm-surge warnings and flood forecasting;

URGES all Members to continue and strengthen their support to this project and to contribute the necessary technical resources towards its expeditious implementation; and

REQUESTS the Secretary-General:

(1) To continue to provide the necessary support to the Tropical Cyclone Project;

(2) To assist countries as necessary in the implementation of relevant recommendations made by the relevant co-operating organizations.

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Resolution 10 (Cg-VII)
RESEARCH IN TROPICAL METEOROLOGY

THE CONGRESS,

NOTING:

- (1) Resolution 27 (Cg-IV),
- (2) Resolution 6 (Cg-VI),
- (3) Resolution 18 (Cg-VI),
- (4) Resolution 8 (EC-XXVI),

COMMENDS the Executive Committee and the Secretary-General for the action taken in promoting research in tropical meteorology including the support rendered to the relevant tropical GARP sub-programmes;

NOTES with satisfaction that some Members have developed research and training programmes in tropical meteorology and that some research and training institutes for tropical meteorology, including meteorology of arid and semi-arid zones, are already in existence and that plans exist for establishing others,

CONSIDERING:

(1) The need for further research in tropical meteorology for the better understanding of tropical atmospheric systems leading to improved accuracy in weather forecasting and meteorological applications,

(2) The potential benefits to many countries of the vast amount of GATE data and the need to help scientists, especially in developing countries, to make optimum use of these data, as well as data from other experiments, and to enable them to participate in studies of tropical meteorology conducted elsewhere for improved operational forecasting of tropical phenomena,

ENCOURAGES Members to intensify research in tropical meteorology, and to co-operate in joint research projects, especially in the fields of:

- (i) tropical cyclones and associated storm surges;
- (ii) monsoons;
- (iii) droughts;
- (iv) meteorology of arid and semi-arid zones;
- (v) tropical disturbances

giving particular attention to:

/(a)

- (a) The maximum use of numerical models and recent developments in satellites to improve the understanding of atmospheric circulation within the tropics;
- (b) The exchange of scientific information between research institutes and analysis centres, and particularly for participation of research scientists from developing countries in relevant research projects;
- (c) The establishment of additional research institutes for tropical meteorology and analysis centres where necessary;

DECIDES to encourage and give increasing emphasis to research in tropical meteorology;

REQUESTS the Executive Committee:

(1) To give consideration to the development of a coherent WMO programme on research in tropical meteorology and, in the light of this, to take appropriate steps to encourage its development and implementation;

(2) In the meantime, to give increased attention and to take appropriate action to promote and co-ordinate development of research in tropical meteorology, taking into account the information contained in the annex to this resolution, including the organization of symposia, technical conferences and training seminars on tropical meteorology; the preparation of relevant Technical Notes; publishing periodic progress reports on research in tropical meteorology; the provision of advice to Members, on request; and improving the training of meteorological personnel specializing in tropical meteorology;

REQUESTS the president of CAS to keep under review research developments in tropical meteorology and to make appropriate proposals to the Executive Committee on the desirable course of action;

REQUESTS the Secretary-General:

- (1) To arrange for appropriate assistance for tropical meteorological research; and
- (2) To report to Eighth Congress on the progress achieved and to submit proposals for further activities in this field.

/APPENDIX B.

APPENDIX B.

WMO TROPICAL CYCLONE PROJECT PLAN OF ACTION

Implementation Programme

<u>Sub-project No. and title</u>	<u>Proposed mode of implementation</u>	<u>Status</u>
1. Special tropical cyclone observing network (Anemometer and barometer networks)	Australia with the collaboration of U.S.A., Japan, India and the Typhoon Committee Secretariat	Accepted by Members concerned and TCS. Work is about to begin.
2. Observations from mobile ships	Hong Kong in collaboration with Japan, Mauritius, Pakistan and Thailand	Accepted by Members concerned. Work is about to begin.
3. Automatic weather stations)	Studies being undertaken by CIMO
4. Radar		
5. Geostationary satellites	U.S.A. in collaboration with Japan, U.S.S.R. and ESRO	Accepted by Members concerned and ESRO. Work is about to begin.
6. Forecasting tropical cyclone intensity and movement	U.S.A. in collaboration with U.S.S.R., India, Hong Kong, Japan and the Typhoon Committee Secretariat	Accepted by Members concerned. Work is about to begin.
7. Storm surge prediction	Japan in collaboration with India and U.S.A.	Under implementation by team of experts composed of: Dr. Miyazaki (Japan) Leader, Dr. P.K. Das (India) and Dr. C.P. Jelesnianski (U.S.A.)
8. Risk evaluation techniques	WMO Secretariat with assistance of consultants for UNEP project	Being implemented in conjunction with UNEP/WMO Project on Quantitative Evaluation of Disaster Risk (Tropical Cyclones)

<u>Sub-project No. and title</u>	<u>Proposed mode of implementation</u>	<u>Status</u>
9. Tropical cyclone warning systems	India in collaboration with Japan, Australia, France (La Réunion) and U.S.A.	Accepted by Members concerned. Work is about to begin.
10. Community preparedness and disaster prevention	WMO with the collaboration of UNDR0, ESCAP and LRCS	Under implementation with contributions from the UNDR0 project on "State of the Art in Disaster Prevention and Mitigation" and from the Joint LRCS/ESCAP/WMO project on "Guidelines for Community Preparedness and Disaster Prevention"
11. Flood forecasting	CHy assisted by Secretariat in collaboration with Members	- Session of CHy Working Group on Hydrological Forecasting (Geneva, June 1975) to consider work plan and implementation - CHy Rapporteur on Flood Forecasting Resulting from Tropical Cyclone Rainfall to report to above working group - WMO/ESCAP investigation of pilot basin flood forecasting system to be undertaken in Tropical Cyclone Panel countries

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FOR PARTICIPANTS ONLY

WRD/TC.8/8 Add.1
7 October 1975

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

CO-ORDINATION WITH THE WMO TROPICAL CYCLONE PROJECT
AND REGIONAL PROGRAMMES

(Item 8 of the provisional agenda)

Note by the WMO secretariat

Addendum

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The attached table forms part of Appendix A of document WRD/TC.8/8.

SUMMARY OF SCIENTIFIC ASSESSMENTS OF STUDY AREAS RELATED TO TROPICAL METEOROLOGY RESEARCH

I. TROPICAL CYCLONES AND STORM SURGES

(a) Tropical cyclone dynamics and numerical modelling Better understanding of tropical cyclone development and behaviour	(b) Tropical forecasting research Improvement of prediction accuracy and techniques in detecting and tracking storms	(c) Storm surge forecasting techniques Improvement of the accuracy of storm surge predictions	(d) Tropical cyclone moderation experiment Understanding of the physics of tropical cyclones and capability or reducing damage by cloud seeding	(e) Other studies and observational requirements specifically related to WMO Tropical Cyclone Project To help facilitate the implementation of the Project
<ul style="list-style-type: none"> - Dynamics of tropical cyclone structure (generation and development) - Numerical modelling (3-dimensional) to simulate life cycle of tropical cyclones - Simulation of cumulus convection, cyclone eyes, eye walls and rain bands - Scale interaction - Quantitative numerical model experiments to study forcing factors (sea surface temperature, surface stress, depth of the moist layer strength of the trade inversion, upper tropospheric inversion and vertical wind shear, etc.) - Mechanism of moisture and momentum transport - Coupling of outflow with the environment 	<ul style="list-style-type: none"> - Prediction of tropical cyclone movement and intensity (occurrence and development) - Evaluation of tropical analysis techniques and development of an operational synoptic model - Various problems involved in numerical prediction techniques for the tropics - Statistical and dynamical forecasting with knowledge of tropical wave motion and its modification by forcing mechanisms, scale interaction, coupling mechanism and convection parameterization, etc. - Studies of synoptic conditions for cyclone formation - Climatological investigation 	<ul style="list-style-type: none"> - Estimation of storm characteristics (central pressure, maximum wind, radius of eye wall and speed of propagation, time and location of land-fall and tangential wind profile, etc.) - Numerical modelling procedures (bottom friction in shallow water, non-linear interaction between the main surge component and the astronomical tide and the vertical structure of the surge) - Testing of prediction by mathematical models 	<ul style="list-style-type: none"> - 3-dimensional cyclone structure and micro-physical parameters on both modified and natural storms at different stages of development - Comparison between observations and predictions of numerical analogues - Location, timing and selectivity of cloud seeding process - Transport mechanism of heat, water and mass - Assessment of structural changes due to seeding 	<ul style="list-style-type: none"> - Use of radar for determination of rainfall rate and estimation of cyclone movement and intensity - Research on wind damage - steady turbulent flow in strong winds, wind tunnel experiments on turbulence and numerical experiments on topography and oriented airflow - Exchange of information on radar fixes, objective forecasts of storm movement and satellite data - Design of improved satellite picture receiving equipment - Strengthening of the network of tide gauges/wave recorders in coastal areas (for studies on storm surge prediction) - Quantitative precipitation forecasting techniques, rainfall runoff relations and flood routing
data - Initial data for numerical modelling nts - Aircraft reconnaissance flight data - Satellite data - GATE data	- Upper-air data - Satellite data	- Data from tide gauges and wave recorders	- Meteorological and cloud physics data by aircraft	- Wind and precipitation data - Satellite data - Tide and wave data, etc.
Common to (a) through (e)		- Mitigation of damage to life and property - Improved planning and operation of agriculture and water resources		
Encourage and, if necessary, initiate and co-ordinate research efforts by all research bodies concerned Facilitate full use of GATE data in fundamental studies of tropical atmosphere		Common to (a), (b) and (c) Common to (a) and (b)		Guidance and support for the planned experiments, if possible through WMO/Weather Modification Programme (WMP) - Establish plans and co-ordinate further activities of WMO and regional bodies concerned - Seek advice from Technical Commissions concerned as necessary

II. MONSOON	III. PROBLEM OF DROUGHTS	IV. METEOROLOGY OF SEMI-ARID CONTINENTAL ZONES		
<p>Studies of the monsoon phenomena on global and regional scales</p> <p>Better understanding of the phenomena and to improve prediction techniques</p>	<p>Research aspects of tropical droughts</p> <p>Assessment of the likelihood of drought conditions</p>	<p>(a) <u>Inter-Tropical Convergence Zone (ITCZ)</u></p> <p>Prediction of climatic regime and the likelihood of droughts</p>	<p>(b) <u>West African disturbance lines</u></p> <p>Understanding of meso-scale structural details and their behaviour</p>	<p>(c) <u>Easterly waves and cloud clusters</u></p> <p>Understanding of the physics of wave-cluster interaction</p>
<ul style="list-style-type: none">- Influence of the strength of mid-latitude westerlies on the monsoon- Modification of general circulation by seasonal heat source and sink variation- ITCZ related to the monsoon circulation- Relationship between rainfall distribution and circulation pattern- Role of interhemispherical exchanges in the summer monsoon- Stratospheric circulations in summer and winter monsoon- Contributions of surface albedo and aerosol content to radiation balance- Effect of sea surface temperature on monsoon- Numerical experiment with high resolution	<ul style="list-style-type: none">- Behaviour of tropical systems within the planetary circulation and the interaction between tropical systems and systems in mid-latitudes- Numerical experimentation, i.e., comparisons of results with models (a) incorporating the land masses of the Northern Hemisphere and (b) without incorporating land masses- The heat balance and albedo over desert areas and the extent to which these locally determine the climate, also the effect of soil moisture content- The water vapour budget on a regional scale and the nature of its control on tropical phenomena- Different structures and behaviour of particular tropical systems over the land and over the sea- The influence of ocean parameters on atmospheric systems, i.e., sea surface temp. anomalies- Statistical analysis aimed at detecting correlation between rainfall and larger-scale circulation and topographic features	<ul style="list-style-type: none">- Testing of theories of ITCZ and refinement of its definition- ITCZ over the ocean:<ul style="list-style-type: none">- its linkage with boundary-layer process in low latitudes (water vapour and mass convergence)- Growth of wave disturbances- ITCZ over the continent:<ul style="list-style-type: none">- its structure and determining factors (moisture convergence and surface heating)- rainfall regime determined by its position and structure- Development of prediction models- Climatological studies of ITCZ	<ul style="list-style-type: none">- Origin and structure of the systems- Vertical distribution of wind, temperature and moisture- Effect of orography and larger-scale systems, e.g., ITCZ and monsoon- Connexion between disturbance lines and Atlantic hurricane formation- Overall meso-scale structure and their role in modifying the structure of larger-scale systems	<ul style="list-style-type: none">- CISK, Wave-CISK and CISK-ability- Statistical analysis of meteorological parameters- Diagnostic analysis of results from modelling of equatorial troposphere- Mixed sub-cloud layer and planetary boundary layer- Spectra of cloud dimension to test parametric cloud models- Physical interaction of various atmospheric features on different scales
<ul style="list-style-type: none">- Synoptic data, including from satellites- Quantitative data on forcing factors- Ocean observation data	<ul style="list-style-type: none">- Meteorological and water resources data (the historical record)- Improved upper-air data covering continental areas- Relevant GATE data	(Common to (a), (b) and (c))	<ul style="list-style-type: none">- Upper-air data- GATE data, particularly from satellites and aircraft- Meso-scale surface data- radar imagery	
<ul style="list-style-type: none">- Improved planning for agriculture through prediction of monsoon onset	<ul style="list-style-type: none">- Improved planning for agriculture and other economic activities through prediction of drought conditions	(ditto)	<ul style="list-style-type: none">- Prediction of rainfall with passage of the systems	
<ul style="list-style-type: none">- Observational aspects of monsoon studies under WWF and FGGE- Encouragement and co-ordination of extended studies on the monsoon phenomena including support to MONEX	<ul style="list-style-type: none">- Encourage and co-ordinate research projects in atmospheric processes in the tropics relevant to droughts	(ditto)	<ul style="list-style-type: none">- Propose establishment of dense network- Promotion and co-ordination of research studies relevant to the subjects including use of GATE data and possible future experiments in the relevant region	

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
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LIAISON WITH THE WHO/ESCAP PANEL ON TROPICAL CYCLONES

(Item 9 of the provisional agenda)

Note by the secretariat

Introduction

1. The Typhoon Committee is aware of the need for collaboration and some degree of co-ordination with the activities of the WHO/ESCAP Panel on Tropical Cyclones. For this reason, the Committee has requested the representative of Thailand, which is a member of both the Committee and the Panel, to act as its rapporteur on the Panel's activities (see para. 103 of the report of the seventh session).
2. It is also significant that the Panel, which held its first session only in late 1973, has patterned its programme upon that of the Typhoon Committee. To a large extent, both groups of countries face similar problems and the areas they cover are geographically contiguous. The similarity of their objectives, and of their approach to these objectives, facilitates co-operation between the two bodies, which, it is suggested, should now be strengthened.

3. The purpose of this document is twofold. Firstly, to inform the Typhoon Committee of recent developments in the Panel's activities and, secondly, because these developments seem to point to a need for closer liaison in the future, to put forward proposals for ways in which this improved liaison might be effected.

Developments in the Panel's activities

4. At its first session, the Panel adopted a co-ordinated technical plan setting forth its long-term objectives. This plan comprises four components - meteorological, hydrological, community preparedness and disaster prevention, and training and research. It thus parallels exactly the Typhoon Committee's programme. At its second session (Colombo, December 1974), the Panel reviewed and brought up to date its technical plan. At that session, it gave further consideration to the pressing need for technical advice and guidance in the management of its programme. It learned that ESCAP was continuing negotiations with the Government of the Netherlands to secure the services of a technical adviser. It was also informed of the readiness of UNDP to consider providing support to its programme.

5. Since the second session of the Panel, ESCAP has received confirmation from the Netherlands that it is willing to finance the provision of a technical adviser for a period of two years. It was stipulated that the adviser should, if possible, be recruited from a developing country. At the time of preparing this document, a suitable candidate for this post had been selected with the agreement of WHO and the steps necessary for his recruitment had been initiated. It was hoped that he would be able to assume his duties towards the end of 1975.

6. This technical adviser will form the nucleus of a Technical Support Unit (TSU) for the Panel, with functions similar to those performed by the Typhoon Committee secretariat (TCS) in Manila. It is expected that he will be based in Madras (India), the Government of India having expressed its readiness to provide the necessary facilities at the Tropical Cyclone Warning and Research Centre.

7. One of the first tasks of the technical adviser will be to assist in the formulation of a project request for submission to UNDP for further assistance to the Panel. In order that the request may fully reflect the needs of the member countries, it is planned that the technical adviser

/will

will participate in a fact-finding mission to the countries concerned in early 1976. There can be little doubt that the request to UNDP will seek to augment the technical expertise available to the Panel through the appointment of one or two other professional staff, one of whom might assume leadership of the Technical Support Unit.

8. The Panel's activities are therefore about to move into a much more active phase than has hitherto been possible, increasing the need for close liaison between the Committee and the Panel in order to ensure the maximum effectiveness in the work of both bodies.

Proposals for improved liaison

9. On the basis of discussions that have taken place between WHO and ESCAP, the following proposals for liaison are submitted to the Committee and the Panel for consideration:

- (a) The senior technical advisers (or senior staff members at the time of TCS and TSU) should participate in all meetings of the Committee and the Panel;
- (b) The two senior technical advisers should meet at least twice a year with representatives of WHO and ESCAP, these meetings to be arranged as far as possible in conjunction with the annual meetings of the Committee and Panel;
- (c) Subject to suitability on other considerations, meetings of the Committee and Panel should be spaced approximately six months apart (it was envisaged that this would be desirable for a number of reasons).

10. The Committee may wish to consider the desirability of giving these liaison meetings a more formal status, such as the establishment of a Liaison Group.

11. It is realized that unification of TCS and TSU might, in the long run, provide the best basis for efficient operation of both programmes but it does not seem appropriate to consider such a move at this stage.

Action proposed

12. The Committee is invited to consider the proposals put forward under paragraphs 9(a) to (c) and 10 above with a view to deciding on a suitable basis for achieving the desired liaison with the Panel.

PARTICIPANTS ONLY

WRD/TC.8/10
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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

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WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee

Eighth session
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PROVISIONAL LIST OF DOCUMENTS

	<u>Document No.</u>
1. Provisional agenda	WRD/TC.8/1
2. Annotated provisional agenda	WRD/TC.8/2
3. Notes for the information of participants	WRD/TC.8/3
4. The Committee's activities during 1975	WRD/TC.8/4
5. Programme for 1976	WRD/TC.8/5
6. UNDP technical support to the regional typhoon programme	WRD/TC.8/6
7. Staffing of the Typhoon Committee secretariat beyond 1976	WRD/TC.8/7
8. Co-ordination with the WMO Tropical Cyclone Project and regional programmes	WRD/TC.8/8
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11. Provisional list of participants	WRD/TC.8/11
12. Tentative programme	WRD/TC.8/12

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FOR PARTICIPANTS ONLY

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ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

AND

WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok, Thailand

LIST OF PARTICIPANTS

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JAPAN

Representatives: Mr. Junichi Nakamura, Counsellor and Permanent
Representative of Japan to ESCAP, Embassy of Japan,
Bangkok

Mr. Sukeaki Shiino, Director, River Division, Shikoku
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Mr. Teruo Fujinori, Head, Forecast Division, Japan
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Alternates:

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Mr. Yasuhide Koshimura, First Secretary and Deputy
Permanent Representative of Japan to ESCAP, Embassy of
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Mr. Hiroomi Sakai, First Secretary and Deputy Permanent
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PHILIPPINES

Representative: Dr. Roman L. Kintanar, Administrator, Philippine Atmospheric, Geophysical and Astronomical Administration (TAGASA), (Weather Bureau), Department of National Defense, Quezon City

Alternates: Dr. L.D. Kagahastian, Chief, Water Resources Survey Division, Bureau of Public Works, Manila

Lt.Col. Carmelito G. Beltran, Programme Administrator, Quezon City

Mr. M. Komura, Flood Forecasting Warning Expert on the Colombo Plan, Quezon City

THAILAND

Representative: Dr. Charoen Charoen-rajapark, Director-General, Meteorological Department, Ministry of Communications, Bangkok

Alternates: Capt. Prasert Soontarotok R.T.N., Deputy Director-General, Meteorological Department, Ministry of Communications

Mr. Damrong Jaraswathana, Director, Hydrology Division, Royal Irrigation Department, Ministry of Agriculture and Co-operatives

Cdr. Bamrung Saraggananda R.T.N., Chief, Studies and Research Division, Meteorological Department, Ministry of Communications

Mr. Sudchitr Corvanich, Chief, Civil Defence Division, Department of Local Administration, Ministry of Interior

Mr. Pravitt Harnnarong, Chief, Disaster Relief Division, Department of Public Welfare, Ministry of Interior

Mr. Smith Tumasarech, Chief, Telecommunications Engineering Sub-Division, Telecommunications Division, Meteorological Department, Ministry of Communications

Mr. Tawatchai Brikshavana, Chief, Hydrological Forecast Sub-Division, Meteorological Department, Ministry of Communications

Mr. Patipat Patvivatsiri, Chief, Technical Co-operations Sub-Division, Studies and Research Division, Meteorological Department, Ministry of Communications

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THAILAND (continued)

Alternates:
(continued)

Mr. Somsuck Moopueng, Chief, Disaster Relief Section, Civil Defence Division, Department of Local Administration, Ministry of Interior

Mr. Tubkaew Bhiboolnakrin, Assistant Chief, Social Studies and Planning Division, Department of Public Welfare, Ministry of Interior

Dr. Surin Chaitachwong, Physician, Relief Division, Thai Red Cross Society, Bangkok

Dr. Damrong Reinprayura, Physician, Relief Division, Thai Red Cross Society, Bangkok

Mr. Manas Srisomboon, Assistant Chief, Disaster Relief Division, Public Welfare Department, Ministry of Interior

Mr. Amorn Chantanavivate, Second Grade Meteorologist, Meteorological Department, Ministry of Communications

OTHER ESCAP MEMBERS COUNTRIES

FRANCE

Representative: Mr. R. Du Chaxel, Technical Adviser to the Permanent Representative to WMO, Paris

MALAYSIA

Representative: Mr. Ho Tong Yuen, Director-General, Malaysian Meteorological Service, Meteorological Office, Jalan Sultan, Petaling Jaya, Selangor, West Malaysia

UNION OF SOVIET SOCIALIST REPUBLICS

Representative: Mr. V. Fedoseev, Deputy Head, International Department, USSR Hydromet Service, Moscow

Alternates Mr. A. Stepanov, Scientist, USSR Hydromet Service, Moscow

Mr. I.M. Volkov, Assistant Permanent Representative to ESCAP, USSR Embassy, Bangkok

UNITED STATES OF AMERICA

Representative: Mr. Nels E. Johnson, Director, Office of International Affairs, National Oceanic and Atmospheric Administration, Department of Commerce, Washington D.C.

Alternate: Mr. Lucian L. Rocke, Jr., Deputy Permanent Representative to ESCAP, American Embassy, Bangkok

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OTHER STATE ^{1/}

GERMANY, FEDERAL REPUBLIC OF

Representative: Mr. J. Droege, Third Secretary (Economic and Commercial),
Embassy of the Federal Republic of Germany, Bangkok

OTHER UNITED NATIONS BODIES

United Nations Development
Programme (UNDP)

Mr. Thomas F. Power, Jr., Regional
Representative of the UNDP, Bangkok

Ms Gillian Walker, Assistant Regional
Representative of the UNDP, Bangkok

United Nations Office of
the Disaster Relief
Co-ordinator (UNDRO)

Mr. Gerald F. Williams, Co-ordination
Officer, Prevention and Planning Division,
UNDRO, Geneva

SPECIALIZED AGENCY

International Civil
Aviation Organization
(ICAO)

Mr. F.A.L. Oliveira, Regional Meteorological
Adviser, ICAO Regional Office, Bangkok

NON-GOVERNMENTAL ORGANIZATION

Category I

League of Red Cross
Societies (LRCS)

Dr. Kingsley J. Seevaratnam, Regional
Officer for Asia, The League of Red Cross
Societies, Geneva

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^{1/} Members of the United Nations, participating in a consultative capacity
under paragraph 9 of the Terms of Reference of the Commission.

SECRETARIAT

ESCAP

Mr. H. Rudy Gontha

Officer-in-Charge for the Executive
Secretary

Mr. A.I. McCutchan

Chief, Natural Resources Division

Mr. George T. Finlinson

Chief, Water Resources Section,
Natural Resources Division

Mr. M. Kawamura

Economic Affairs Officer, Water Resources
Section, Natural Resources Division

Mr. P. Rogers

Economic Affairs Officer, Water Resources
Section, Natural Resources Division

Mr. K.A. Dikshit

Chief, Programme and Co-ordination Office

Mr. R. Suhartono

Economic Affairs Officer, Programme and
Co-ordination Office

Mr. C. Roy Smith

Chief, Division of Administration

Mr. H.P.T. Willis

Chief, Conference and General Services
Section, Division of Administration

Mr. Bernard D. Dorkenoo

Chief, Information Service

Mr. Arthur H. Cooke

Information Officer

Mr. Satis Indrakamhaeng

Information Officer

Mrs. N. Suthimai

Chief, Language Services

Mr. P. d'Arifat

Interpreter

Mr. R. Krasker

Interpreter

Mr. C. Lamarche

Interpreter

COMMITTEE FOR CO-ORDINATION OF INVESTIGATIONS OF THE LOWER MEKONG BASIN

Mr. Somnook Sudhampun

Hydrometeorologist

SECRETARIAT (continued)

WMO

Professor J. Nemec	Chief, Hydrology and Water Resources Department, WMO, Geneva
Mr. F.P. Alves	Chief, Observing Systems Branch, World Weather Watch Department, WMO, Geneva
Mr. P.J. Meade	Consultant, WMO, Geneva

TYPHOON COMMITTEE SECRETARIAT

Dr. S.N. Sen	Chief Technical Adviser, Typhoon Committee Secretariat, c/o UNDP, Manila
Mr. C.H. Tang	Telecommunication and Electronic Expert, Typhoon Committee Secretariat, c/o UNDP, Manila
Mr. A. Hamamori	Hydrologist and Flood Forecasting and Warning Expert, Typhoon Committee Secretariat, c/o UNDP, Manila

INVITED EXPERT

Mr. S. Nesadurai	Assistant Director-General, Drainage and Irrigation Department, Kuala Lumpur, Malaysia
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12 November - Wednesday (contd.)

- (2) Agenda item 5: UNDP technical support to the regional typhoon programme (WRD/TC.8/6)
 - (a) Under the 1974-1976 project
 - (i) Equipment component
 - (ii) United Nations experts and counterpart staff
- 1430 - 1700 hours
- (3) Continuation of discussion on agenda item 5
 - (a)(iii) Fellowships
 - (iv) Bilateral assistance
 - (b) UNDP support beyond 1976

13 November - Thursday

- 0930 - 1200 hours
- (1) Agenda item 6: Staffing of the Typhoon Committee secretariat beyond 1976 (WRD/TC.8/7 and WRD/TC.8/13)
- 1430 - 1700 hours
- (2) Agenda item 7: Programme for 1976 (WRD/TC.8/5)
- (3) Agenda item 8: Co-ordination with the WMO Tropical Cyclone project and regional programmes (WRD/TC.8/8)

14 November - Friday

- 0930 - 1230 hours
- (1) Agenda item 9: Liaison with the WMO/ESCAP Panel on Tropical Cyclones (WRD/TC.8/9)
- (2) Agenda item 10: Consideration of the agenda for the next session of the Committee
- (3) Agenda item 11: Date and place of the ninth session

15 November - Saturday

0930 - 1300 hours Meeting of the Drafting Committee

16 November - Sunday

17 November - Monday

- 0930 - 1230 hours
- (1) Consideration of the draft report
- (2) Closure of the session

FOR PARTICIPANTS ONLY

WRD/TC.8/12
15 October 1975

ORIGINAL : ENGLISH

ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC
AND
WORLD METEOROLOGICAL ORGANIZATION

Typhoon Committee
Eighth session
11-17 November 1975
Bangkok

TENTATIVE PROGRAMME

11 November - Tuesday

0900 - 0945 hours

Registration

1000 - 1030 hours

Opening session

- (1) Statement by the Executive Secretary of ESCAP
- (2) Statement by the Secretary-General of WMO
- (3) Election of the Chairman and Vice-Chairman

Recess 20 minutes

1050 - 1230 hours

- (4) Adoption of the provisional agenda
- (5) Agenda item 4: the Committee's activities during 1975 (WRD/TC.8/4)

1430 - 1700 hours

- (6) Continuation of discussion on agenda item 4
 - (a) Meteorological component
 - (b) Hydrological component

12 November - Wednesday

0930 - 1230 hours

- (1) Continuation of discussion on agenda item 4
 - (c) Community preparedness and disaster prevention
 - (d) Training and research